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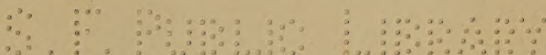
THE SOUL AND ITS STORY

A SKETCH

BY

NORMAN PEARSON

AUTHOR OF "SOME PROBLEMS OF EXISTENCE," "SOCIETY SKETCHES IN THE
EIGHTEENTH CENTURY"



LONDON

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To
MY OLDEST FRIEND
THE MASTER OF BALLIOL

PREFACE

I HAVE described this work as a sketch, and indeed it is nothing more, for a full treatment of the question to which it is addressed would require almost as many volumes as there are chapters in the book. The difficulty of this inquiry has been accentuated by the wide diversity and frequent fluctuations of the opinions entertained about its subject. According to older ideas the soul, though temporarily associated with a material vehicle, was supposed to be something quite independent of, and sharply distinguished from, this and matter. Matter at one time was regarded as something base and impure from which the soul was ever struggling to shake free. Even in the act of creation it was supposed that the Deity would not come into contact with it; "for it was not meet that the wise and blessed One should touch chaotic and defiled matter."¹ Nowadays, however, the point of view has shifted considerably. On the one hand, Materialism treats all mental phenomena as mere products of a particular kind of matter; while, on the other, there is a strong tendency to regard mind and matter, not as two distinct and opposed existences, but rather as two diverse aspects of a single reality. It is supposed also that this ultimate reality is probably something spiritual. Naturally, mind is looked upon as nearer to this spiritual origin than matter, and, indeed, is not seldom more or less identified with it. Matter, however, on this

¹ οὐ γὰρ ἦν θέμις ἀπείρου καὶ πεφυρμένης ὕλης ψάνειν τὸν ἵδμονα καὶ μακάριον.—*Philo*.

view, also partakes of spirit, and thus mind and matter are not fundamentally opposed to each other, but are fundamentally akin. Mind, indeed, is sometimes regarded as being itself the ultimate reality, and matter merely one of its phases or manifestations. This, however, puts the case too broadly to be accurate. The source of all things must no doubt be something more or less mental in character, but no form of mind with which we are acquainted can possibly constitute the ultimate reality. This must be sought for in a higher realm. It must be something which, though the source of all the objects of our experience, cannot be identified with any of them, and, indeed, transcends them. We may call this Spirit, and regard Matter, Mind, and Soul, which is a higher form of mind, as its products.

Since Matter and Mind, then, have a common origin, and a definite relationship in virtue of that origin, it is probable that their history and development form part of a single plan. If this be so, we may hope to get some glimpses into the story of the soul's evolution by keeping a watchful eye on the evolution of Matter. This may not be an infallible guide, but it is one of the best which we can find, notwithstanding that, as Soul mounts upwards, its course must ultimately diverge from that of Matter. I have sought help from this source repeatedly, being convinced that if there be a real solidarity between all things which form part of the scheme of our universe, the plan of the whole must permeate its various parts. Motion, matter, mind, life, soul, are thus linked together, and from any one of them we may learn something about the others. Soul, indeed, in its full development will no doubt outstrip them all, but nevertheless the others point the course of that development, even though they cannot follow it.

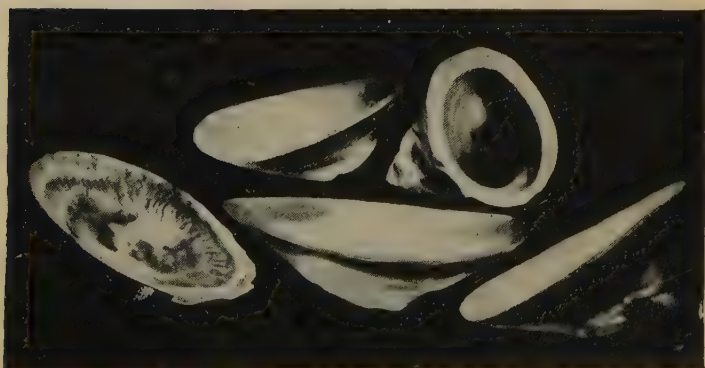
This is the story which I have attempted in outline to

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AN OSMOTIC MUSHROOM FORM.

ARTIFICIAL SHELLS.



(OSMOTIC GROWTHS IN THE FORM OF SHELLS.)

Here we have close inorganic imitations of leaf, flower and shell.
(From Leduc's "Mechanism of Life," by permission of Mr. W. Heinemann)

ARTIFICIAL PLANT-LIKE GROWTH.



(OSMOTIC GROWTH PRODUCED BY SOWING A MIXTURE CaCl_2 AND MnCl_2 IN A SOLUTION OF ALKALINE CARBONATE, PHOSPHATE, AND SILICATE. THE STEM AND TERMINAL ORGANS ARE OF DIFFERENT COLOURS)

(One-third of the natural size)

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ARTIFICIAL PLANTS.



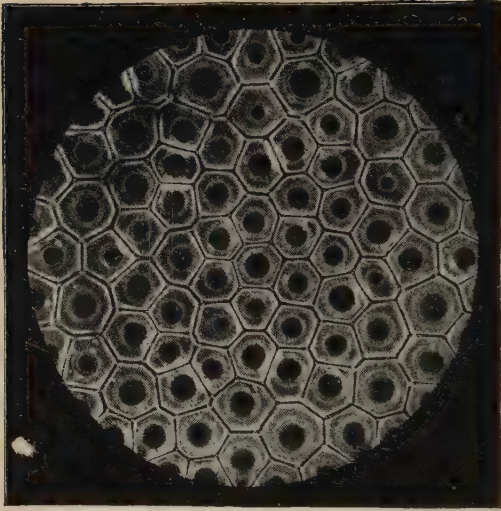
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OF AMMONIUM IN A COLLOIDAL SOLUTION)



CRYSTALLIZATION OF SODIUM CHLORIDE IN A
COLLOIDAL SOLUTION, GIVING A PLANT-LIKE
FORM.)

(From Leduc's "*Mechanism of Life*," by permission of
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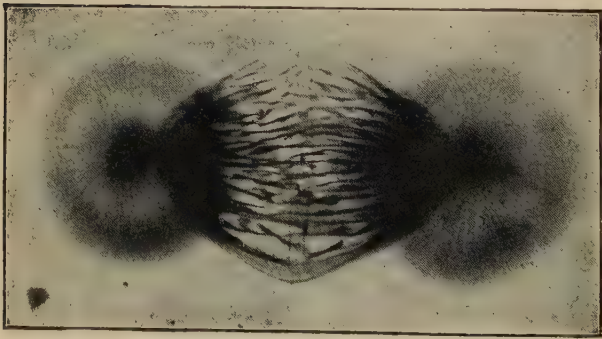
ARTIFICIAL CELLS.



(TISSUE OF ARTIFICIAL CELLS FORMED BY THE DIFFUSION
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Here we have a group of imitation cells.

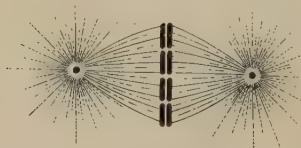
ARTIFICIAL MITOTIC FIGURE.



DIFFUSION FIGURE REPRESENTING KARYOKINESIS

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ACTUAL MITOTIC FIGURE.



MITOTIC FIGURE IN LIVING CELL DIVISION.

(From Wilson's "*The Cell*," by permission of the author.)

portray. I am keenly conscious of gaps left unfilled, and of points treated scantily which I would fain have dealt with fully; but such omissions and imperfections are inevitable in a sketch, and the book pretends to be nothing more.

The chapter on "Sex" and that on "Subhuman Consciousnesses" have appeared in a somewhat altered form in the *Nineteenth Century and After*; and I am indebted to the courtesy of the editor of that periodical for his kind permission to reproduce them here.

N. P.

LONDON, .

October, 1916.

CONTENTS

CHAPTER I

THE QUESTION STATED

	PAGES
What is the soul?—It is not identical with the self.—The “I” and the “Me.”—It is the permanent something which underlies the self for the time being.—Creation and Traducian explanations of its origin.—Archdeacon Bevan and Professor Gwatkin—Theology does not pronounce decisively upon its origin.—Difficulties attach to either explanation.—M. Fournier’s psychomeres.—Leibnitz’s Pre-established Harmony.—Physical biology gives no clue to the transmission of psychical entities.—Physically life is transmitted, but not <i>a</i> life; and if not <i>a</i> life, why <i>a</i> soul?	1-11

CHAPTER II

MATERIALISM AND THE SOUL

Materialism denies the independent existence of the soul or any mental principle.—It holds life and mind to be merely properties of Matter.—Bastian.—Kingsland.—Haeckel.—Huxley.—Many difficulties attach to the Materialist theory.—The inner nature of Matter is inexplicable on Materialist lines.—The Matter of our senses is really a mental generalisation of impressions given to the mind by unknown external forces, and consequently Mind must be prior to Matter.—In this unknown energy lies the Reality which is behind both Mind and Matter.—Mere unguided energy is insufficient to account for the construction of the universe.—deTunzelmann.—Lodge.—Hence this energy must exercise some intelligent guidance.—Such guidance would not involve a violation of Natural Law.—Materialists reject any metaphysical Mind, but are forced to assume an equally metaphysical energy.—Materialists cannot explain the origin of man’s moral equipment.—Schäfer.—Saleeby	12-23
--	-------

CHAPTER III

IS THERE AN INDEPENDENT SOUL ?

PAGES

What positive grounds are there for supposing an independent soul to exist ?—If mental phenomena were merely products of the material brain, mentality ought to vary with the size of the brain, but this is not entirely the case.—Moreover, we only use half the brain, *i.e.* the “working” hemisphere, for mental work.—Effect of trance on the unused hemisphere.—Apparently, therefore, the “working” hemisphere is selected by a Thinking something.—Sensation and Perception distinguished.—Feeling and knowing brain centres.—The Perception, or “knowing,” centre is only in the “working” hemisphere.—The cross-relation between the brain and the body.—The “working” hemisphere is connected with the “working” hand.—The formation of the “knowing” centres is not due to the muscular activity of the “working” hand.—Primary and secondary selves.—The phenomena of the secondary self show that a Thinker is at work on the tissues

24-34

CHAPTER IV

MATTER AS KNOWN TO US

The soul is a living activity, but Matter is *apparently* inert.—Really, however, Matter is full of motion—molecular, atomic, electronic.—The sizes and numbers of molecules, atoms, and electrons.—The modern meaning of “atom.”—The atom is composed of electrons.—Matter is really convulsed with motion.—Matter according to the electronic theory not only contains motion, but is motion.—Matter is reducible to electricity, and electricity to a mode of ether.—Beta rays.—Atomic force.—Alpha rays and “emanation.”—The nature of ether discussed.—The primal source of ponderable matter is something imponderable

35-44

CHAPTER V

THE CONDITIONS OF LIFE

None of the activities of inanimate matter can account for life, but living matter must have evolved from non-living matter.—The two distinctive properties of living matter are the powers of growth and reproduction.—Protoplasm, its composition and properties.—Isomerism and Allotropism.—The differences between things are due to differences of structure.—Life is the reward of complexity of structure.—The cytode.—No abrupt division between

the organic and the inorganic.—Early vital functions are largely chemical.—Chemotaxis.—Anticipation of vital forms in inorganic matter.—Cyanic acid, metals, crystals, foam-structure, waterdrops, myeline.—Colloids.—Life utilises while it modifies inorganic activities.—Leduc's experiments.—Blood and sea-water.—Inorganic evolution shows a steady preparation for the entrance of life 45-59

CHAPTER VI

THE APPEARANCE OF LIFE

Life requires a suitable material vehicle before it can appear.—Matter has evolved from something non-material—*i.e.*, Spirit.—Some element of mind is associated with even the simplest forms of matter.—Matter is formed by a rush through ether initiated by Spirit.—Mind may be formed by a similar rush through "Mind-stuff."—Mind-stuff is extended.—Sir William Hamilton and Herbert Spencer on the relations between Mind and Matter.—Idealistic explanation.—McCabe.—Mind-stuff may be ethereal or quasi-ethereal.—Ethers of various densities.—The order in Nature can only be explained by the association of mind with matter.—Every atom is under some mental control.—Life cannot appear in matter till the associated mind in it rises to the level of sentience, which transforms mere mass into an organism.—Sentience cannot come from matter or motion alone.—Life is purposeful.—Life, mind, and organic structure are correlated.—Life and mind have a spiritual origin.—Wallace.—de Tunzelmann - - - - - 60-72

CHAPTER VII

ARCHEBIOSIS AND HETEROGENESIS

Has Archebiosis occurred more than once?—Experiments with organic infusions unsatisfactory.—No death-point could be agreed upon.—Possible degeneration of the fluid through over-heating.—Experiments with inorganic solutions more satisfactory.—Infusions give active, solutions motionless, organisms.—Solutions can also be degraded by over-heating.—Acid solutions are often better than alkaline.—Heterogenesis is often complicated by questions of infection.—Chlorophyll corpuscles transformed into amœbæ.—Fungus germs, Flagellate Monads, and Amœbæ produced from Zooglœa at will by regulating the temperature.—If the organisms produced in these experiments are formed synthetically, who or what is the synthetiser? - - - - - 73-81

CHAPTER VIII

THE DAWN OF THE SOUL

PAGES

The soul is a development of the mind.—All quality, mental or physical, depends on structure.—With the growth of physical complexity there is a concomitant growth of mental complexity.—These mental complexes are, in fact, mind-structures.—Various grades of mind-structures, atomic, chemical, vital.—Chemical and vital mind-structures survive the disintegration of the material bodies to which they belong.—The vital mind-structure is the root of the soul.—An ordinary vital mind-structure can never rise above consciousness, but the soul is *self-conscious*.—Self-consciousness discussed.—Résumé - 82-94

CHAPTER IX

AN EVOLUTIONAL DIFFICULTY

Between Man and the higher anthropoids there is a great mental gap, which conflicts with the idea of continuous evolution.—Human and anthropoid brains are very similar in construction, but differ in size, weight, and complexity.—Bastian.—Broca.—Man is not descended directly from the anthropoids, but only from the same ancestral stock.—Geological eras.—High cranial capacity of early man.—Heidelberg man (Neanderthal).—Spy men.—Gibraltar man.—Pithecanthropus.—Eoanthropus.—Precursors of man may perhaps date back to the Eocene.—Higher and lower prehistoric races are often contemporaneous.—Polyphyletic theory of human origins.—Extinct anthropoid species.—Native Australians.—Soul evolution by means of migration from one species to another.—Theosophical theory of the missing link - 95-111

CHAPTER X

THE MARK OF THE MAN

Self-consciousness marks the dawn of the soul.—Speech is the outward mark of this.—Speech, though a mental acquirement, needs a suitable physical structure.—The anthropoids are physically unfitted for speech.—But incapacity for speech does not imply incapacity for thought.—Visual images and other natural signs may take the place

of words.—Spirit drawings.—Language is more valuable for communicating than for forming thoughts.—Gesture language preceded, and helped to develop, speech.—The relation of the working hand to the speech centre (Broca's convolution) in the brain.—Ambidexterity.—Stammering.—The connection between bodily activity and brain development.—Muscular activity may improve the capacity for speech, but cannot give the words spoken.—Brain-registries.—Résumé of soul-emergence	112-124
---	----------------

CHAPTER XI

SUBHUMAN CONSCIOUSNESSES

Discussion of the subhuman consciousnesses from which the human soul is developed.—This development can only take place through some anthropoid form.—Lower consciousnesses may be appropriated by higher ones, as animals appropriate the protoplasm formed by vegetables.—Thus the human soul may be built up of many subhuman consciousnesses.—It is improbable that the human soul can be itself appropriated by any higher consciousness.—Various grades of living beings.—Possible activities of subhuman consciousnesses while in a discarnate condition.—They may serve as instruments for the operations of Nature.—Their possible action in telepathy and animal intuition.—Professor James's experiments.—Nature spirits.—Browning.—Wordsworth.—Résumé of soul-evolution	125-142
--	----------------

CHAPTER XII

A QUESTION IN SOUL EVOLUTION

The evolution of mind is conditioned by that of its physical vehicle.—Physical evolution proceeds by the preservation and transmission of beneficial variations.—Natural selection.—Origin of variations.—Variations are either germinal or acquired.—Can acquired variations be transmitted or not?—Theories of Weismann and others.—Unless acquired variations can to some extent be transmitted, mental evolution would advance too fast for physical evolution: the minds would get ahead of the brains.—The effects of education would be severely curtailed.—The individual could be mentally improved, but these improvements could not be transmitted	143-157
--	----------------

CHAPTER XIII

EXAMINATION OF WEISMANNISM

PAGE

Weismann's theory of heredity.—His fluctuations of opinion.—	
Effect of external influences on (1) unicellular, (2) multicellular organisms in producing heritable variations.—	
His belief in the isolation of the germ-plasm criticised.—	
His denial of the transmission of acquirements criticised.—	
—More evidence of this transmission in plants than in animals.—Regeneration.—Weismann's objections to the transmission of acquirements.—The <i>Anableps</i> .—The dog's habit of turning round before lying down.—Natural selection deals only with survival.—Herbert Spencer's argument for the transmission of acquirements based on the co-adaptation of co-operative parts.—Weismann's reply to it.—Archdall Reid's reply to it.—Archdall Reid criticised	158-172

CHAPTER XIV

EXAMINATION OF WEISMANNISM (*continued*)

Certain other cases of apparently transmitted acquirements.—	
Thickened skin of the sole of the foot.—Leg-bones of Punjaub people.—Butterflies, flatfish, salamanders.—Transference of male characters to females.—Weismann's theory of the direct influence of the environment on the germ-plasm.—Romanes on reflex action as evidence of the transmission of acquirements.—Oscar Hertwig.—Hering.—Zehnder.—Circulating fluids of the body.—Puberty and castration.—Cunningham, Spencer, and Bastian on Weismann.—Weismann's theory of germinal selection.—Determinants and biophors.—Acquirements <i>may</i> be transmitted	173-184

CHAPTER XV

THE TRANSMISSION OF ACQUIREMENTS

The question is, Can an acquired modification of a parent's brain be transmitted <i>in any form whatever</i> to the progeny ?	
—Weismann's admission.—Galton's theory of germs thrown off by cells which may affect the germ-plasm.—Delage's theory.—Insufficiency of Natural Selection as the <i>sole</i> principle of evolution.—Panmixia.—Mutilations.—Non-transmission of speech.—The position summed up	185-199

CHAPTER XVI

PERSONAL IDENTITY AND THE SOUL

PAGES

Popular view of personal identity and the soul.—Hume's account of personal identity stated and criticised.—Memory.—Mill's theory proves insufficient.—James's theory that the thoughts are the thinker.—Sidis's criticism.—James's theory that consciousness rests ultimately on respiration.—Other theories having failed, it becomes necessary to postulate a soul behind the self 200-210

CHAPTER XVII

THE SOUL AND THE SELF

The soul as a substance, or as a principle or activity.—No insuperable difficulty in supposing mind-stuff to be extended.—There is some sort of continuity between mind and matter, since both emerge from spirit.—Bergson's view of the relation of mind to matter.—How far the self really varies.—The seat of the soul.—Explanation of variations in the self.—The soul and the self are one but not identical.—The process of memory.—Morton Prince on *The Unconscious*.—Engrams.—Transmutations of sense experience.—Is an engram neural or psychological?—Effect of gland-secretions and toxins on the self.—The conservation of energy is no objection to an independent soul.—Ferments.—An unextended soul is inconceivable 211-226

CHAPTER XVIII

THE UNITY OF THE SOUL

Multiple personality as bearing on the unity of the soul.—Alma Z., Louis V., Felida X.—Resemblance between primary and secondary personalities and the normal and hypnotic self.—Presumably, a secondary personality, like the hypnotic self, springs from the subliminal consciousness.—A primary self is the soul's response to the ordinary stimuli of the environment.—A secondary self is produced by change of the stimuli affecting the soul.—How this change may be produced.—Sidis's account.—Secondary selves are usually alternative, but occasionally concomitant, like "Sally."—"Sally" discussed.—She may be explained as due to a different but concomitant set of stimuli applied to a different part of the soul.—Evidence that she sprang fundamentally from the same source as the other selves.—She was not an invading consciousness.—She does not disprove the unity of the soul 227-243

CHAPTER XIX

SEX

PAGES

Sex, though primarily physiological, has psychical features.—Originally sex had no reference to reproduction, but sprang from conjugation.—Conjugation benefits the individual by rejuvenescence, but not directly the race.—Amphimixis and Amphigony.—Parthenogenesis.—Hermaphroditism.—Artificial fecundation.—Mendelian explanation of sex.—Dominant and recessive factors.—Homozygous and heterozygous.—Saleeby.—Morgan.—Males are katabolic, females anabolic.—Havelock Ellis on sexual distinctions.—Nature uses sex for the preservation of antagonistic qualities which cannot be combined in one organism.—Many sexual qualities have a value independent of reproduction.—They may survive in the soul notwithstanding the destruction of the body.—They may be guides to recognition in hereafter.—As long as human personality endures sexual distinctions must survive 244-264

CHAPTER XX

THE SOUL AND THE ABSOLUTE

In order to ascertain the relation of the soul to the Universe, we must consider the nature of Reality.—Reality is usually identified by philosophers with the Absolute, of which souls are temporarily isolated parts.—Bradley's account of the Absolute.—Bosanquet's account of the Absolute.—Lotze, Fechner, de Tünzelmann, and McTaggart on personal immortality.—Nirvana.—Lord Ernest Hamilton's *Involution*.—Difficulties presented by the theories of the Absolute.—Green on the survival of the personality.—Bradley and Bosanquet make God an aspect of the Absolute.—Hegel, Lotze, and Green identify God with the Absolute.—The Absolute seems incompatible with the soul's progress - - - - - 265-274

CHAPTER XXI

THE SOUL AND THE PARTICULAR

Philosophies of the Absolute rest on a basis of re-integration.—May not the true principle be one of orderly disintegration?—Creation is not the production of all things from nothing, but the unfolding of the many from the one.—Bergson's spirit is a tension of which Matter is a relaxa-

CONTENTS

xix

PAGES

tion.—May not creation be the result of the creative power striving to realise itself by a partial relaxation ?—Analogies from physical Nature.—Spirit, the ultimate Reality, may be regarded as something in the nature of a Conscious Volitional Energy.—The process of creation.—The philosophy of the Becoming.—Bergson's *élan vital*.—Divine power limited.—Perfection can only be realised in a combination of diverse qualities, but these may rest on an inner harmony.—Do the laws of Matter conflict with our views ?—Le Bon.—Duncan - - 275-285

CHAPTER XXII

REINCARNATION

Is reincarnation a necessity for man ?—Reasons for accepting it.—St. John's Gospel, xiv. 3.—Schiller.—McTaggart.—Popular objections to reincarnation discussed.—Why is there no memory of past incarnations ?—St. John's Gospel, ix. 2-3.—The soul survives though the self changes - - - 286-294

CHAPTER XXIII

THE SOUL AND THE UNIVERSE

The soul advances through the experience of its selves, till all the lessons of experience have been learnt.—Religious feeling requires a personal God.—Such a God must be finite and limited in power, a self-limitation of Spirit.—Evil.—Right and wrong.—The sense of inferiority.—The innateness of moral instincts supports the view that acquirements can be transmitted.—The human will cannot be free.—Determinism justified.—In what sense prayer is justifiable.—Different ideas of God in different ages.—God as man's friend.—The possibilities before the soul as one of God's agents.—Some souls may fail to advance, and, as souls, become extinct - - 295-316

LIST OF PLATES

PLATE

- | | | | |
|----------------------------------|---|---------------------------------|--------------------------|
| I. ARTIFICIAL MUSHROOM | } | <i>Between pages 56 and 157</i> | |
| ARTIFICIAL SHELLS | | | |
| II. ARTIFICIAL PLANT-LIKE GROWTH | | | |
| III. ARTIFICIAL PLANTS | | | |
| IV. ARTIFICIAL CELLS | | | |
| ARTIFICIAL MITOTIC FIGURE | | | |
| ACTUAL MITOTIC FIGURE | | | |
| V. EOANTHROPUS DAWSONI | - | - | - <i>Facing page 102</i> |

THE SOUL AND ITS STORY

CHAPTER I

THE QUESTION STATED

WHAT is the soul? The word has acquired by usage a special religious significance as that something in us which is specially concerned with the relations of the individual to the Deity, and the moral aspects of his conduct. I do not exclude this application of the word at all, but I include a great deal besides. On the other hand, I distinguish it, as will be seen, from the self. The soul, as I regard it, comprehends much more than any particular self. The self, as ordinarily understood, includes, and is the representation of, the character, tastes, faculties, and mental equipment of the particular man. In considering the self, however, we are necessarily restricted to the present—to the living man, the John Jones before us. But John Jones as we know him did not exist in the past and will not exist in the far future. The past contained something out of which John Jones has evolved; the future may contain something into which he will then have evolved; but the existing John Jones belongs to the present. Consequently, if the soul of John Jones has any history at all, it cannot be identified with his present self, which is but one chapter in that history. In common parlance the self and the soul are frequently used as interchangeable terms, being indiscriminately applied to that part of the human individual which is expected to survive physical death. This usage, though misleading, contains an element of truth. The self of the moment has not, indeed, any claim to pose as the entirety of the soul, of which it is only a part, or partial expression. As Sir Oliver Lodge remarks, in somewhat different language, but on similar lines:

"Our actual personality may be something considerably unlike that conception of it which is based on our present terrestrial consciousness—a form of consciousness suited to, and developed by, our temporary existence here, but not necessarily more than a fraction of our total self." And again, "It is quite credible that our whole and entire personality is never terrestrially manifest."¹

Theology moves slowly, and rightly so, in these grave matters; but the startling revelations of Psychology as to the instability of the self are bringing theologians to recognise that the self, though bound up with the soul, need not be identical with it. Nevertheless, though the self is merely a temporary manifestation, it *does* represent, for the time being, that part of man which is, or at any rate may be, eternal. It is the visible symbol in our present life of a fundamental something upon which the individual is founded, and partakes of the permanency of this something. Under ordinary conditions the self is our only present point of contact with the soul, the only rift in the darkness through which the soul can be revealed to us. In this sense, therefore, it is to some extent identical with the soul. But this admission requires to be still further guarded; for if the soul comprises more than any self, the self includes much which obviously cannot be ascribed to the soul. For the human self is not only a thinker or perceiver, but a thing thought or perceived. It is an object as well as a subject; or, as the late Professor James put it, it is a "Me" as well as an "I." The "I" is the thinking or knowing self; the "Me" the self thought about or known. Consequently the "Me" of John Jones would include this body and other transitory attributes which did not belong to him in the past, and will not attach to him in the hereafter. James allows very comprehensive limits to the "Me."

"In its widest possible sense, however, a man's Self is the sum total of all that he CAN call his—not only his body and his psychic powers, but his clothes and his house, his wife and children, his ancestors and friends, his reputation and works, his lands and houses yacht and bank account."²

¹ *Life and Matter*, 109, 123.

² *Principles of Psychology*, i., 291.

This estimate of the contents of the "Me" may be rather extravagant, but it serves to emphasise the radical differences between the soul and the "Me." The yacht and the bank account may conceivably be included in the "Me"; they react upon the "I," no doubt, but they stand, nevertheless, outside it, and they certainly form no part of the soul. This, then, cannot be identical either with the "I" or the "Me," but must be a permanent something underlying them both. It is this permanent something with which we are here concerned, with the story of its growth in the dim past and its possible destiny in the future.

Obviously in a quest like this no certain conclusion is possible. All that we can do is to marshal such facts as are available, ponder their significance, and strive to learn what lessons they have to teach. But, in truth, they cannot teach us much. They may perhaps point the way, but they will not reveal the goal; and any conclusions which we may reach will be conclusions which, at the best, show the greatest probabilities; at the worst, the fewest difficulties.

And yet, in spite of the discouragements which frown upon it, the attempt is worth making; it is worth while to face this great question which so nearly concerns us fearlessly and honestly, for on the answer which we find to it the whole interest of our existence depends. Even if we sink back baffled, the attempt will not have been all in vain; for in our struggle to win the truth we may at least clear away some of the errors which obscure it. If we do not attain the certainty of what must be, we can perchance get a glimpse of what may be, and a fairly solid conviction of what cannot be.

One of these difficulties confronts us on the threshold. I have spoken of the story of the soul's past. But has the soul any past? Has it been fashioned, like the rest of mundane existence, slowly and painfully by the forces of nature; or is it bestowed, a newly created boon, on the human infant at birth, and the human infant only? In seeking to decide between these alternatives we shall find that either course is beset with perplexities, scientific and philosophical. If we turn to the established religion for an explanation we shall not get much help, for ecclesiastical

teaching on this point has been rather uncertain. Origen (A.D. 230) believed in the pre-existence of the human soul, holding that God in the beginning created all finite spirits, and that these occupied the bodies of angels, men, or demons, migrating higher or lower according to their merits. This particular doctrine, which is, of course, a form of metempsychosis, seems to have been condemned later on by the Church, but it is plainly not identical with either of the theories now under discussion, though it partakes of the nature of both. It gives the soul a past, but not an evolutionary past, while it also traces it to a created origin. Tertullian, on the other hand (A.D. 160), declared that the soul of a man was, like his body, derived from parental sources, the souls of the whole human race being contained, in germ at any rate, in the body of Adam. But this theory too, at all events in the crude form given to it by Tertullian, has lost its hold on ecclesiastical belief.

By the kind permission of two eminent authorities whom I have had the privilege of consulting, I am enabled to quote the following opinions on the subject. Archdeacon Bevan writes:

"I should be inclined to say that no authoritative statement has been put forth by the Christian Church as to whether *Traducianism* (or the theory of derivation of the child's soul from that of the parent) is, or is not, to be preferred to *Creatianism* (or the theory that every soul born into the world is a fresh creation). It may be that the *πνεῦμα* as well as the *ψυχή* is implanted by the parent, or it may be that there is a spiritual birth at the same moment as the physical birth. If the soul of man was originally *evolved*, I should imagine that that was because it was *involved* from the very first in some germ form; but Genesis i. 26 seems to favour the idea that, as life and consciousness must have been new creations originally, so the *soul* was *added* to the human ape-like animal, which was thus 'made man'; i.e., (1) God made man of the 'dust of the ground'—in other words, the *animal* called 'Man' was evolved like other animals; but (2) God said, 'Let us make this man into our own (spiritual) image'—so man 'became a *living soul*.' (I take it that a '*living soul*' means *πνεῦμα plus ψυχή*.) Being a '*living soul*,' therefore, he would naturally transmit his entire nature (body, soul, and spirit) to his offspring."

Professor Gwatkin writes:

"Liddon has no right to say that Christianity is committed to Creatianism. Leo of Rome says the precise contrary, and the

Church of England lays down no doctrine on the matter. In fact, I believe both theories are untenable. If the soul comes straight from God, it must come pure, and the evil is in the body—which is Gnosticism. And if it is simply derived from the souls of the parents, we get into materialistic difficulties. As a matter of fact, a man is not simply the resultant of his ancestors. Even in plants we cannot keep a variety true from seed: we must have cuttings. Both theories are bad, for (1) they assume a dichotomy of body and soul instead of the threefold division of body, soul, and spirit. The non-bodily part is double, not single. And (2) Can we sharply and exactly separate even these three? Is even the body fully expressed by what we see? Are we not coming to see that we do not even know what matter is? May not this mortal frame enclose (not a *Luz*¹ but) a new body fed by faith and ready to break the husk at the archangel's call? Delitzsch gave the position some forty years ago, but it needs revision in the light of the newer theories of matter, scientific and philosophical."

It is clear, I think, from these interesting letters that theology has not pronounced decisively upon either theory. Creationism is probably the more widely held of the two, but it presents, nevertheless, some obstinate perplexities. It is almost impossible to reconcile it with the doctrine of the hereditary transmission of mental qualities. For if the qualities which go to make up a man's character are derived from his parents or remoter ancestry, they cannot also be conferred on him by a new creation. Sometimes this difficulty is met by an appeal to a theological doctrine known as the Pauline Trichotomy, to which allusion is made in the above letters. According to this man's nature is threefold, and consists of Body ($\sigma\acute{\omega}\mu\alpha$), Soul ($\psi\upsilon\chi\eta$), and Spirit ($\pi\nu\epsilon\upsilon\mu\alpha$). The body, of course, presents no difficulties for our present purpose. But the term "soul" is rather misleading, for $\psi\upsilon\chi\eta$ here does not quite mean what we usually mean by soul. It is used in a wide variety of senses, which range from mere life to the spiritual soul, but, on the whole, it is something lower than the $\pi\nu\epsilon\upsilon\mu\alpha$. In St. Paul, at any rate, $\psi\upsilon\chi\iota\kappa\acute{o}\varsigma$ seems to mean rather the natural or carnal man, as opposed to the spiritual man, whose will and higher qualities have conquered his animal nature. In

¹ The *Luz* was supposed by the Jewish Rabbis to be an indestructible bone in the human body, out of which the new body will be formed after death.

Jude 19 it is even rendered "sensual," and applied to those who are devoid of the *πνεῦμα*—"Οὗτοι εἰσι οἱ διορίζοντες, *πνεῦμα μὴ ἔχοντες*."

Πνεῦμα has also a variety of meanings, but on the whole it may be said to denote the distinctively human part of man. It is then suggested that the *ψυχή*, or lower consciousness of a man, may be derived from ancestral sources, but that the *πνεῦμα*, or spiritual element, is a new creation at his birth. The explanation, however, is not very satisfactory; for there is really no hard-and-fast line between the two words, which indeed, as we have seen, are frequently used interchangeably in the New Testament to indicate everything in man which distinguishes him from the mere animal.¹ And, in truth, it is exceedingly difficult to give any intelligible contents to the *πνεῦμα* which are not contained, potentially at all events, in the *ψυχή*. Man, no doubt, has a notion of self which must be added to the *ψυχή* before human self-consciousness can arise out of animal consciousness. But if the *πνεῦμα* is to be regarded as consisting simply of this apprehension of selfhood, it is obvious that such an apprehension is more intelligible as a development from within than as a shadowy impression from without. Again, since every child born is to be credited with a soul, the doctrine of Creatianism requires us to suppose that man has an indirect but unlimited power of calling into existence new souls. According to the Christian eschatology these souls have an immortal future before them, which may be one of happiness, but may also be one of torment. Indeed, if it be true that few only are to be saved, the doom of hell (whatever this may be) must be in store for most of the souls so called into existence. Is it conceivable, then, that God should have put into the hands of a savage or a criminal the power of manufacturing victims for damnation? Universalists, who hold that all human beings will ultimately be saved, escape this perplexity only to fall into another. For if eternal happiness is to be the destiny of every soul that is created, it must be the duty of mankind, regardless of immediate consequences, to bring into existence as many heirs as possible to an eternity of bliss.

¹ Row, *Future Retribution*, 189.

Obviously, however, this principle could not be put into practice without upheaving the social and moral laws of the civilised world.

If, to escape these embarrassments, we decide in favour of an evolutionary growth of the soul, we are confronted by another set of difficulties. We must adopt some form of Traducianism, but it is not at all easy to frame any workable theory of it. We have seen that Creatianism conflicts with the facts of hereditary transmission; but these same facts seem equally repugnant, though on other grounds, to Traducianism. The soul may be, as a matter of fact, a compound, or rather, perhaps, a complex—an organic combination gradually built up out of simpler elements. But as we conceive of it now it appears to be a unity. How is this unity to transmit its qualities to its offspring without itself suffering disintegration? What is the spiritual something which passes from each parent to blend into a new unity in the soul of the child? Physiologically, the first step in the formation of a new human being is the union of a sperm-cell (male) with an ovum or egg-cell (female). Sperm-cell and egg-cell each contain a portion of the germ-plasm of their respective stocks, in which germ-plasm all their transmissible qualities are supposed to reside. By this combination of the parental germ-plasms in the fertilised ovum the child becomes endowed with the transmissible qualities, personal and ancestral, of each of its parents. This is intelligible enough so far as physical qualities are concerned. They are contained in the physical germ-plasms, are transmitted with the transmission, and mingled in the mingling of these. But what of the spiritual elements of which the soul must be composed? Where is their place in this process of transmission? The father's features, or some of them, may reappear in his offspring, the mother's eyes or even the ring of her voice. We find no difficulty in accrediting these to physical sources, though we cannot detect the structures which embody them. But the father's mathematical talent, the mother's musical genius, these are transmitted also—but how? They, surely, are qualities of the mind or spirit, not of the body, and the mechanism by which physical heredity is effected does not

seem to explain the facts of mental heredity. Is there, then, some sort of spiritual germ-plasm by which the transmission of non-physical qualities is secured? M. Fournier propounds a theory of this kind. He supposes the germ-cells, as, indeed, all other cells, to have appropriate souls of their own, and he gives the following explanation of psychical heredity.

“When two germ-cells meet and merge, their souls are liberated from their parent organisms. The ‘lines’ which constitute them intertwine, swing loose from the two parent groups, and form a new knot on a level with the souls of the parent individuals. At that moment, in a flash of rapture, a new soul is conceived and enters into the world in which its two parents move.”¹

Whatever the merits of this explanation may be, it does not throw much light on the point before us. According to M. Fournier, souls are composed of certain units which he calls “psychomeres,” or of systems of such units. These units, however, are admittedly material in character, being possibly identical with Weismann’s biophors. In this case there seems to be no real distinction between the psychomeres and the germ-plasm, and hence the difficulty of spiritual or mental heredity remains untouched.

Or, again, does spiritual transmission perhaps belong to a higher plane, beyond the reach of our apprehension altogether? It may be so; but in this case intelligible speculation becomes impossible. We are quite unable to conceive in what manner such a transmission could be effected, or what its connection with physical transmission could be. The question, indeed, is part of the question, What is the nature of the relation between the mind, soul, spirit—call it what you will—and the body? Leibnitz’s doctrine of a Pre-established Harmony between soul and body shifted the problem, but did not solve it. In his *Considerations on the Principles of Life*, he says:

“Thus, according to my system, souls or the principles of life do not change anything in the ordinary course of bodies, and do not even give God *occasion* to do so. Souls follow their laws, which consist in a certain development of perceptions, according to the goods and the evils; and bodies also follow their laws, which consist

¹ *New Light on Immortality*, 126.

in the laws of motion; and, nevertheless, these two beings of entirely different kind are in perfect accord, and correspond like two clocks perfectly regulated on the same basis, although, perhaps, of an entirely different construction. This is what I call Pre-established Harmony, which removes all notion of miracle from purely natural actions, and makes things run their course regulated in an intelligible manner; whereas the common system has recourse to absolutely inexplicable influences, and in that of Occasional Causes, God, by a sort of general law and if as by agreement, is obliged to change at each moment the natural course of the thoughts of the soul to accommodate them to the impressions of the body, and to disturb the natural course of the motions of bodies according to the volitions of the soul; that which can only be explained by a perpetual miracle, while I explain it quite intelligibly by the natures which God has established in things."¹

Leibnitz was impressed by the impossibility of conceiving how soul could act upon body or body on soul, and his Pre-established Harmony seemed to him a convenient way out of the difficulty. As he could not explain the interaction, he denied it.

"I have already said . . . that everything takes place in souls as if there were no body, and that everything takes place in bodies as if there were no souls."²

But the doctrine puts too severe a strain upon our common sense; and in the absence of conclusive evidence in its favour, we cannot believe that the apparent connection between soul and body is simply an illusion. We cannot believe that body and soul follow separate and independent courses, without being affected in any way by each other, or that the close accord which apparently obtains between them is merely a series of carefully prepared coincidences. The soul wills that the body should walk, and the legs are duly set in motion; but this physical action has not, according to Leibnitz, any connection whatever with the mental volition, and would, indeed, have occurred without it. Truly the explanation seems harder than the problem which it seeks to explain. It preserves the unity of the soul, but at the cost of its fundamental dissociation from the body in which it is manifested.³ Moreover, it does not touch the

¹ Duncan, *Philosophical Works of Leibnitz*, 164-5. ² *Ib.*, 169.

³ The parallelism of Leibnitz is dualistic—i.e., it is a parallelism of a physical fact and a psychological fact. There is, however, a mon-

difficulty immediately before us—namely, how any psychical unity like a soul can be transmitted from parent to child. But, unless such a spiritual transmission can in some way be effected, it is impossible to see how the psychical experience on which evolutionary progress depends can be handed down for the benefit of succeeding generations, or how there can be any succession of psychical unities to profit by this experience.

We can hardly wonder, therefore, that, in the face of all these obstacles, thought should sometimes turn back dispirited, and ask, Is there any permanent soul at all? Is soul anything more than a special vital manifestation of the living organism, which ceases with the other vital manifestations on the death of the body? The facts of physical biology seem arrayed against us. In the lowly unicellular animals and plants (protozoa and protophyta) the cell divides, and the cell life passes on into the two new cells thus formed. The divided life passes on, but the identity of the original cell has disappeared. And this process of cell division, which is at the root of all vital growth, provides scrupulously for the transmission of life and the sentience or consciousness with which life is associated, but takes no care to preserve the individual cell. Higher up in the scale of existence, among the multicellular metazoa and metaphyta we find the beginnings of sexual reproduction. But here again, though the offspring resembles the parent, though it conforms to the type, there is no transmission of any unity such as we deem the soul to be. The offspring is formed out of the germ-plasm temporarily harboured in the bodies of the parents, which, however, is itself but a part of the germ-plasm descending to them from their respective progenitors through countless generations. It is not the specific production of the individual parents: it is but a guest to whom the parental body offers a temporary shelter. The germ-plasms of the two parents blend in the offspring, which in its turn carefully preserves a small portion of this

istic form of parallelism—namely, a parallelism of two aspects of the same thing. Such a parallelism would regard mind and matter as fundamentally identical, matter being merely a form in which mind is manifested.

blended germ-plasm for transmission to its own progeny. And so the race is preserved, but the individuals perish. Life is sent down from parent to child through the ages, but not *a* life. And if not *a* life, why *a* soul? The question is not an easy one, but the attempt of this book will be to throw some light upon it.

CHAPTER II

MATERIALISM AND THE SOUL

THE difficulties which beset the conception of the soul as an independent spiritual unity with an evolutionary origin and development have been briefly indicated in the preceding chapter. The origin and development of the physical part of man is admittedly evolutionary. His mental side is closely linked with his physical side, and, moreover, displays a development which is, to all appearances, evolutionary also. This development, too, is manifestly concomitant with that of the body, not only in man, but in the story of animal existence generally; that is to say, speaking broadly, that as bodily structures grow more elaborate mental faculty increases correspondingly in power. Yet, if the mental part of man is to be regarded as an independent unity, it is not easy to see how the two can have developed *along the same track*. In the first place, *physical* evolution can only proceed by means of hereditary transmission of beneficial variations, and we have already shown the difficulty of conceiving any similar process of *psychical* transmission. Moreover, if an animal endowed with advantageous physical variations dies without progeny, the benefit of these variations is lost to the race. But what happens in such a case to the mental side of the animal? How is its evolution to continue without the body in which it functioned, or some other suitable tenement? If its evolution is to continue it must survive in some way, but what may be the conditions of this surviving existence?

An attempt to deal with these difficulties will be made later on, but meanwhile we must take note of a theory which sweeps them away altogether. Materialism disposes of the whole question by denying the proposition upon which it rests. The difficulties, it declares, do not arise so long as

we confine ourselves to facts without wandering into fancies. Accordingly, it refuses to recognise life or mind as independent principles, regarding all such principles as mere metaphysical fictions. To those who contend that Mind, though closely connected with Matter from the very beginning, is nevertheless something distinct from it, Materialists reply that life and mind, vital and mental phenomena, are properties and phenomena of a particular kind of matter, and have no existence or reality apart from this.

Thus, the late Dr. Bastian says:

“Certain of the objects around us, for instance, have a power of assimilation, of growing, of developing, and of reproducing their kind. Bodies possessing such properties have been arbitrarily named ‘living’ bodies, and the word ‘life’ has been used as a mental symbol connoting the sum total of the properties which distinguish such bodies from the members of the other great class whose representatives do not possess them. These properties are undoubtedly of a much higher and more subtle nature than those of not-living matter, but it should be distinctly understood that they are as much dependent upon the mere qualities and nature of the material aggregate which displays them as the properties of a metal or the properties of a crystal are the results of the nature and mode of collocation of the atoms of which such bodies are composed.

“Putting it still more plainly, we may say that the phenomena manifested by living things are dependent upon the properties and molecular activities of a particular kind of matter known as protoplasm, just as mental phenomena are dependent upon the properties and molecular activities of nerve-tissues, and just as magnetic phenomena are dependent upon the properties and molecular activities of certain kinds of iron.”¹

Conscious states and feelings are mere appanages of nerve actions; and

“their mode of appearance, their increase in intensity, their modifiability by agents modifying the nerve-tissues, and the limitation by which they occur only in association with certain nerve actions taking place in the higher and most complex of an animal’s Nerve Centres, harmonise with the notion that they are in some way an actual outcome of such Nerve Actions—no more capable of being dis severed from the physical conditions on which they depend than is Heat to be dis severed from its physical conditions.”²

¹ *Nature and Origin of Living Matter*, 21-2.

² Bastian, *The Brain*, 689.

Mr. Kingsland thus describes Materialism:

"The fundamental proposition of Materialism is, that the *presentation* which we have in consciousness of an external world is true; things are mainly what they seem. Matter and force as we know them—as apparently constituting a definite universe altogether independent of any cognising consciousness—are the only *Reality*; and all phenomena, including consciousness itself, are explicable by them."

"Life and Consciousness in this view have no relation to the Cosmic Process as a whole. That process is a purely mechanical one, and Life and Consciousness are *caused*, or produced, by mere mechanical motions of Matter or Substance. They result only from certain more or less complex combinations of atoms and molecules. Matter in its ultimate analysis is what it appears to us to be—*i.e.*, something possessing mass or inertia, and extension in space. Life and Consciousness are only incidents in the aggregation of matter which we call our Earth, and possibly of other Globes in space—provided the conditions of temperature, etc., are suitable—*i.e.*, approximate to our own. When our Globe finally falls into the Sun, or freezes out by reason of cessation of the Sun's heat, that is simply an end of the vast process which has evolved *Man* out of primitive protoplasm, primordial slime, or cosmic star-dust. The process has no meaning; it subserves no cosmic purpose; it had no design to commence with, and it leads nowhere. Such is the Materialist's bald, bare theory."¹

This, it is true, is the account of an Idealist, but I do not think that Materialists would hesitate to accept it.

In such a system as this there is no room for an independent soul which survives the death of the physical organism. That which has masqueraded as a soul, consciousness, or other mental entity, was, at the best, only cosmic energy manifesting itself for the time being in this form. The energy, indeed, is immortal, but the various shapes which it assumes are not. Thus Haeckel declares that

"at our death there disappears only the individual form in which the nerve substance was fashioned, and the personal 'soul' which represented the work performed by this. The complicated chemical combinations of that nervous mass pass over into other combinations by decomposition, and the kinetic energy produced by them is transformed into other forms of motion."²

This method does indeed dispose of all difficulties about the soul, but at a ruinous cost. We are required to suppose

¹ *Scientific Idealism*, 160-1.

² *Monism*, 51.

that all intellectual achievement of the individual, all spiritual advance, will be lost, and that all the lessons of experience will be learned in vain. The soul of the philosopher has no higher destiny than the body of the worm. "A pig and a martyr, a prayer and a beef-steak," can all be reduced alike to variously complicated modes of motion. Mental and spiritual quality is but a passing phase which has no persistence. Energy all things are, and unto energy shall they return. The wastefulness of such a system seems almost malignant, and it is hopelessly incompatible with any faith in an intelligent direction of the Universe. But these considerations have no terrors for the Materialist, to whom the Universe is a mechanism without a mind. Matter and its properties are the only realities which can be dealt with. He finds matter moving in accordance with ascertained laws, and he wants nothing else. It is true that in conjunction with certain kinds of matter consciousness appears: but it is merely an *epiphenomenon*—a by-product of the process of material change. Consciousness happens to attend the process, but forms no essential part of it; and the process would go on just as certainly without any attendant consciousness. Huxley regarded Consciousness as a superfluous luxury, a useless thing, which attends the physiological process, but does not constitute it. Suppress it, and the brain would still continue its functions as before, though no consciousness would accompany them.

But before delivering ourselves over to this dispiriting creed, let us examine its pretensions a little more closely. If Mind is to be explained as a property of Matter, how is Matter itself to be explained? The answer is by no means so easy as some Materialists would have us suppose. They reject the notion of an independent mind or mental principle as a mere fiction resting only on a metaphysical foundation, without perceiving that Matter is in precisely the same plight. At first sight its properties seem obvious and intelligible, but a very slight examination dispels this idea, and shows that Matter is fundamentally quite as hard of comprehension as Mind. We cannot explain it without the help of some metaphysical principle. If, for instance, we suppose Matter to be absolutely continuous or solid, we are

met by the difficulty that motion would then be impossible. If, on the other hand, we suppose it to be discrete—that is, with spaces between its molecules—the question at once arises, How does it cohere? If we attempt to explain cohesion by referring it to attraction, we have next to explain what this attraction is. If it is of a material nature, all the difficulties of Matter attach to it. If it is non-material, it is as purely metaphysical as Mind.

But if Materialism cannot even explain Matter on materialistic principles, its attempt to account for Mind on these principles can hardly succeed. And in point of fact it does not succeed. To describe Mind (using the terms broadly) as a “property” of Matter is not really an explanation at all. This, indeed, is hardly denied. Bastian, for instance, frankly admits that, though generalised conceptions of certain classes of phenomena have been embodied in the terms “life” and “mind,” neither of which terms corresponds with any independent existence, yet we are impotent to “explain” the relation or nexus of causation between vital or mental phenomena and the physical molecular activities which accompany them respectively.¹

This is an obstacle which Materialism can never surmount. The interaction between mind and body is a highly mysterious matter, but its mysteries cannot be dispelled by attempting to suppress the distinction between the two. Consciousness and thought belong to one order of phenomena; the chemico-physical changes of brain-tissue with which they are correlated to another. The physical can only produce the physical, and it is impossible by any effort of the imagination to translate a change of nerve-tissue into a thought. As Tyndall points out, the production of consciousness by molecular action is quite as inconceivable on mechanical principles as the production of molecular action by consciousness.²

Leibnitz, as we have seen, sought to escape from the difficulty by denying the interaction altogether. But the Parallelism with which he replaced it is too fantastic a conception to win a general acceptance, and a belief in inter-

¹ *Nature and Origin of Living Matter*, 22.

² *Fragments of Science*, ii., 224.

action of some kind still holds the field. The will to strike seems linked with the blow which follows. Love and Hate, Happiness and Sorrow, are all associated with corresponding bodily states. Thought acts on the bloodvessels when we blush with shame or modesty, or grow pale with dread. Sudden joy may cure an illness; incessant worry may bring on an attack of gout. How are these facts to be explained on the Materialist theory that Mind is an appanage of Matter? For in all these instances the mental term of the interaction is *prior* to the physical term; the state of Mind precedes the state of body. But, according to Materialism, the physical must always precede the mental, for a thing must obviously be prior to its manifestations.

And this leads us once more to the inquiry, What is Matter? Its inner nature we have found to be inexplicable on Materialist lines, but what is the Matter of the senses, the Matter of everyday life? We may describe it as having extension (that is to say as occupying a portion of space), and a certain duration in time; as having weight, form, hardness, colour, and so forth. But observe; all these descriptions are *mental judgments*. Mind is on the scene already, and dealing with *something* external to it. The exact nature of this something may be, for the moment, disregarded. Suffice it to say that the Mind receives impressions from it. Whether these impressions correspond with reality we cannot say, but in any case they form the contribution of the senses to our knowledge. By degrees the Mind groups and classifies its knowledge, and, finding that these impressions of externality contain certain common elements, it labels them with a common description. It conceives of them as Matter. It seems, therefore, that the tables have been completely turned. So far from Mind being a mere appanage of Matter, Matter itself is a creation of Mind. It is no more than a generalisation of the properties which external things seem to possess in common, an abstraction formed by Mind out of the data of sense experience, to serve as the vehicle of the unknown forces to which those properties are due. For instance, our simplest idea of Matter is an idea of something hard, something which resists our muscular efforts; but even this simple idea dis-

appears the moment we begin to analyse it. For the muscular effort which we apply to matter is a manifestation of force; and that which can oppose force must itself be force. Matter, in fact, is an inference made by Mind from our sense of resisted motion. Hence, when we describe Matter as hard, we are only comprising under a convenient name our experiences of certain forces external to ourselves. In short, as Sir Oliver Lodge puts it, "Matter is primarily an abstraction or mental concept, invented to account for or to summarise conveniently our consistent apprehension of localised Resistance."¹

And this really disposes altogether of the claims of Matter to priority. For it is impossible that Mind can be produced by one of its own abstractions, and equally impossible that such an abstraction can be fatal to the existence of the Mind which formed it. Indeed, as a moment's reflection will show, we *know* nothing beyond our own states of consciousness, *Esse est percipi*. That which is not perceived by us does not, so far as we are concerned, exist. But perception is a mental process, and consequently, before the existence of Matter can be affirmed, a mind must be present to affirm it. Matter, in short, is merely a name which we give to some of our perceptions, and the existence of perceptions presupposes the existence of a mind which perceives. Mind, therefore, is necessarily prior to Matter.

And here we are faced by a greater problem still; for it is in the unknown forces behind Mind and Matter that the secret of Reality lies hid. This is a secret which man cannot hope to probe. Materialist and Idealist stand equally baffled before it. We are all incapable of explaining ultimate reality. Everywhere, at the back of the familiar, we, all alike, are met by the inscrutable. And yet we cannot turn aside from it altogether, for the whole problem of the human soul depends on what the character of the ultimate reality may be. It is only a single aspect of this which concerns us here, but it is all-important. Is the supreme force which sustains the Universe anything like an intelligence or not? Materialism is compelled to admit the existence of some transcendent force, but is quite con-

¹ *Modern Problems*, 16.

tent that this should be a blind force, of which Matter is the primary product. Mind is but a transitory manifestation of this, a mere by-product of the working of material laws which does not effect the result of the process. But this theory, as we have seen, breaks down. The supposed priority of Matter has been challenged and disproved. The Mind which Matter claimed for its appanage has been shown to be—in a sense—its creator. In Lord Haldane's words, "Apart from Mind and except as *for* it, Matter is an absurdity."¹ And, indeed, it is impossible to form any idea as to how intelligence can issue from the unintelligent. Mechanists loudly proclaim their faith in an order of Nature which is supposed to be capable of accounting for all phenomena; but an order, surely, presupposes an orderer. This raises a presumption at least in favour of the independent existence of Mind. But if Mind be prior to and independent of Matter, it must find place among the forces from which the material universe, as we know it, has originated; in other words, the Power behind this universe must be intelligent.

The more closely we consider this conclusion, the more probable does it appear. Not only does it furnish an adequate origin for the human soul, but it helps us to understand the character and possibilities of Matter. Matter as we know it—*i.e.*, as distinguished from the reality, whatever that may be, which lies behind it—is a mental abstraction, a convenient generalisation of the impressions given by an outside something to our senses, but it is nevertheless rooted in reality. Now, it is admitted on all sides that the immediate cause of Matter must be some form of motion. Motion, therefore, must have existed previously to Matter. But what is Motion? Apart from bodies which move, Motion is inconceivable. "We are as much in the dark," says Dr. Bastian, "as to the real nature of Motion as we are about the real mode of origin of Feeling."² We can only define it as a manifestation of the energy which even Materialists are forced to postulate as the ultimate source of Matter. Matter is therefore a product of energy,

¹ *Pathway to Reality*, 37.

² *The Brain*, 149.

but energy by itself would be insufficient to account for the construction of the material universe. As Dr. de Tunzelmann has shown in his *God and the Universe*, the construction of the universe by unguided energy, though not *absolutely* impossible, is *practically* impossible, as being mathematically infinitely improbable. If we are to rely on the activities of unguided energy alone, the eternal existence and its only possible alternative, the self-origination of a material universe, are both infinitely improbable.

"The eternal existence or self-origination of the universe would violate no natural law, yet the odds against either are infinite; that is to say, they are greater than could be expressed by any finite number, however great this might be."¹ ??

But if unguided energy is insufficient for the task, we are driven to suppose that this must have been accomplished under the guidance of some intelligent and purposive activity. The old objection to this theory was that it offends against the law of the conservation of energy, which declares that the total amount of energy in the universe is fixed and unalterable, and that any such external directive activity would be an addition to it. Dr. de Tunzelmann, however, proceeds to demonstrate how such purposive direction is possible without the infraction of any dynamical laws²—a conclusion which has been arrived at by other investigators on different grounds (see Chapter XVII.).

Now, since Matter is, in the last analysis, energy, all material changes are changes of energy, or, more fully, changes in the distribution of energy. The universe, therefore, might have been fashioned by some intelligent activity guiding the distribution of the energy of the material world, but without *altering its amount*.

Sir Oliver Lodge takes a similar view in his *Life and Matter* :

"The conservation of energy is a legitimate enough generalisation. . . . But . . . the serious mistake which people are apt to make concerning this law of energy is to imagine that it denies the possibility of guidance, control, or directing agency, whereas it has really nothing to say on these topics; it relates to *amount alone*" (p. 23).

¹ *God and the Universe*, 102.

² *Ib.*, 104.

Now, if we turn from the universe to our own minds, we find there just such an activity at work. We find in the human Will an activity which is inseparably associated with effort, intelligence, and purpose. Is it too bold to surmise that this will-power of ours is a humble analogue of that supreme Power by which creation is directed and sustained? If this be so, Matter, so far from being the origin of Mind, is itself called into existence by the action of a spiritual intelligence. Spirit is indeed inconceivable, and full weight must be given to the objection. But it is easier to face the inconceivable than the impossible, and Materialism is impossible. Consequently the belief in some transcendental cause of the material world, so far from being a groundless assumption, is a conclusion which is almost forced upon us. Huxley himself admitted that if he were forced to choose between Materialism and Idealism, he would elect for the latter.

Nor need our faith in this transcendental cause be shaken in the least degree by the fact that we are unable to describe, or even to apprehend, its nature. We can only think in terms of experience, and, consequently, neither in thought nor in language can we hope to represent accurately the ultra-experiential. Finally, it may be observed that this belief offers, at any rate, a possible explanation of the origin of mind, and of the individual soul which is the highest form of mind known to us; while the Materialist account confessedly does nothing of the kind. Our theory may supply a provisional explanation only, but that, surely, is better than no explanation at all.

The Materialist's position, therefore, seems to be untenable. Though he repudiates metaphysical principles, and declines to recognise an independent principle of mind, he is driven to admit the equally metaphysical principle of energy. His claim that Matter is the primary reality cannot stand against the proof that Mind in some form is prior to Matter. And, finally, any attempt to identify the two almost refutes itself; for, as M. Fournier puts it, to say that consciousness and mental action *consist* of motions of material particles is much like saying that wind consists of weather-cocks.¹

¹ *Two New Worlds*, 83.

There is another aspect of the question, which, though hardly within the scope of the present discussion, cannot be altogether overlooked. We have so far been dealing with the *origin* of mind, and it is on this that Materialists wisely concentrate their attention, for its later developments cry aloud against their theory. Even if simple consciousness could be regarded as merely a collateral product of physical processes, no such account is possible of man's moral equipment. Even if Materialism can explain man's intellect, it cannot explain man's heart. If consciousness merely holds a candle to the cerebral activities which would go on equally well in the dark, whence come man's morality and man's religion? Mere temporary awareness cannot give us the sense of right and wrong. What physical process can give birth to the spirit of self-sacrifice? Yet these are as truly part of civilised man as his physical appetites and aversions, and their presence has to be accounted for. They cannot be a product of physical evolution, for they certainly would not promote their possessor's survival. Natural selection, if left to itself, would make very short work of the altruist.

Professor Schäfer, in his much criticised address to the British Association on the origin and nature of life (1912), uttered this warning:

"Lest he [man] be elated with his psychical achievements, let him remember that they are but the result of the acquisition by a few cells in a remote ancestor of a slightly greater tendency to react to an external stimulus, so that these cells were brought into closer touch with the outer world."

All this took place, no doubt, but it is only half the story. Without a long series of such cell-changes mental and moral development could not even have begun; but this does not prove that the cell-changes were the sole cause of the development. Elsewhere in his address he remarks that "living things are governed by laws identical with those which govern inanimate matter." Man, therefore, and all his mental and moral equipment must conform to this rule.

Commenting on this, Dr. Saleeby observes:

"Having finished this article, I shall go down to the beach to bathe. If I get into difficulties my companion, who is a poor

swimmer, will certainly come to my aid. So would Professor Schäfer, I am sure; he would not wait till I was fished out and then do the Schäfer method¹ on me. Now, 'living beings are governed by laws identical with those which govern inanimate matter.' Exactly which of those laws—of gravitation, of inertia, of thermodynamics, or of osmosis—I wonder, would impel my friend through the surf if I were drowning? Or was Mrs. Browning, who would have been 'ploughed' in physiology, right when she said—as all the wise have said since Time was a stripling—that 'it takes a soul to move a body' ? ”²

¹ Restoration of the half-drowned.

² *Pall Mall Gazette*, September 10, 1912.

CHAPTER III

IS THERE AN INDEPENDENT SOUL ?

IN the preceding chapter we have disposed of the Materialist objection that an independently existing soul is impossible. The ground is thus cleared for our advance, and we can now proceed to inquire what reasons there are for believing that such an independent soul actually exists.

It was declared by Karl Vogt, Cabanis, and others, that the brain "secreted" thought as the liver secretes bile. This is materialism in a crude form which is now discredited, but it serves to present in a strong light the underlying principle of Materialism—namely, that mental activities are products of the physical brain. But if this view were true: if it really were the case that all mental activities are produced by a material brain, we should certainly expect to find that the greater the brain-matter, the greater also would the mental capacity be. To some extent this is so. It is the case, speaking generally, that intelligence does to some extent vary with the size and weight of the brain; but this rule has so many exceptions that no theory can be founded on it. Broad deductions may be drawn from the comparison of cerebral volumes, but investigators have now abandoned the idea that cranial capacity accurately indicates the degree of mental endowment. In like manner Dr. Bastian declares that

"it seems perfectly plain . . . that there is no necessary or invariable relation between the degree of intelligence of human beings and the mere size or weight of their brains."¹

For here, as elsewhere, *complexity*, rather than mere size or weight, seems to be the important quality; and

¹ *The Brain*, §70.

"a well-constituted brain of small dimensions may be capable of doing much better work than many a larger organ whose internal constitution is, from one or other cause, defective."¹

Intelligence, in fact, depends rather on the minute internal development of the brain than on its size or weight; and though the brains of a cultivated and intelligent class are likely to be larger on the whole than those of the uncultivated and unintelligent, still, a high intelligence is more closely connected with complexity in the conformation of the brain than with its mere mass.

Indeed, in the case of man, so far from mental capacity varying directly with the size or weight of the brain, we find that the human intelligence does not even use all the material at its disposal. We are accustomed to speak of the human brain as one, whereas we possess, as a matter of fact, not one brain, but two—i.e., the two cerebral hemispheres. Each of these is structurally a duplicate of the other, and each is equally capable of intelligent functioning. Nevertheless, the intelligence does not function through both alike, for, normally, the whole *mental* work of the body is discharged by one of these hemispheres alone. If an injury happens to what we may call the *working* hemisphere the mental faculties suffer, but an injury to the non-working hemisphere will not, *per se*, impair these at all.

"It has been repeatedly shown," says Dr. W. H. Thomson, "by post-mortem examinations that persons have lived for years with only one hemisphere in working order, the other having been virtually destroyed by disease."²

If all mental activities are products of the cerebral grey matter, we should expect to find them "secreted" or otherwise produced as much by one hemisphere as by the other. And the fact that this is not so points to the conclusion that thought is produced, not by the brain, but by something external to it—by something in the nature of a Thinker, who selects the hemisphere to be employed for thought, and uses it for an instrument, as the violinist uses his violin. Under ordinary circumstances, as we shall see,

¹ *The Brain*, 371.

² *Brain and Personality*, 62.

the left hemisphere is the working hemisphere; but Lombroso states that, in cases of trance, the right cerebral hemisphere is usually the more actively employed of the two.¹ This, if correct, is certainly interesting. For, whatever the true explanation of trance may be, this selection of the non-working hemisphere suggests that an intelligence expressing itself in an abnormal manner seeks to operate through the hemisphere which has not been specially appropriated to normal functioning. Myers also found some slight evidence that what he calls "subliminal" consciousness (which is related to trance) is connected with the non-working hemisphere.²

And, indeed, when we look deeper into the matter, we find still stronger indications of the presence of this thinking something. Each of the special senses, seeing, hearing, smelling, etc., has a special area of the brain appropriated to it, or rather it has two special areas, one in each hemisphere. The functions of these specially appropriated areas are *congenital* in man; they are born with him, and they form part of his animal heritage. But the information which they give is strictly limited. They give sensations only, not Perceptions. The distinction is familiar to philosophers, but it is not very easy to express it intelligibly. Indeed, at the stage of mental development which man has reached, a mere Sensation can hardly even be imagined, because it is instantly apprehended by Consciousness, and thereby turned into a Perception.³ "A mere Sensation," says Lord Haldane, "does not exist."⁴ It is just the simple act of feeling. James says: "No one ever had a simple sensation by itself."⁵ He calls sensations the first things in the way of Consciousness. He describes Perception as the higher Consciousness about things, Sensations as merely the inarticulate feeling of their presence. Sensation gives just the fact—some particular sound, colour, pressure, and so forth. Perception consists in *knowing* something about the fact.⁶ A patient under an anæsthetic feels the surgeon's

¹ *After Death—what?* 182.

² *Human Personality*, Abridged Edition, 68.

³ Bastian, *The Brain*, 589.

⁴ *Pathway to Reality*, 293.

⁵ *Principles of Psychology*, i., 224.

⁶ *Text-Book of Psychology*, 12-13.

knife, but he does not *perceive* the feeling, because the gates of his higher consciousness are closed to it. This mere feeling is what is given by the areas of the special senses in the brain. The man sees, or hears, or smells, but he does not *know* what he sees, or hears, or smells. This faculty—the faculty of *knowing* what his sensations are—is on a different footing altogether. It is not *innate* in the individual, but is *acquired* by him; and it has brain areas appropriated to it which are distinct from the sensation areas. But while each hemisphere of the brain is fitted with its own *sensation* area for each special sense—*i.e.*, each hemisphere can see, hear, smell, and so forth—the *knowing* centre is found *in the working hemisphere only*. Each hemisphere is equally well adapted for the formation of these knowing centres, but, as a matter of fact, it is only in the working hemisphere that they are actually formed. Thus, in reference to the sense of sight, Dr. Thomson writes:

“In explanation we shall first state that the primary center of sight in the occipital lobe is in the neighborhood of a wedge-shaped convolution called the ‘cuneus.’ This convolution, of course, is found equally in both hemispheres, and that it is directly related to sight is proved by the fact that it is only when the region of this convolution is destroyed in both hemispheres that total blindness is produced. That function of sight in the cuneus is doubtless congenital, but the child when born does not know what it sees. That particular power is afterwards acquired, not by the cuneus, but by an adjacent area of brain-cells, in front of the cuneus, which we ourselves for the purpose of convenience will hereafter call the precuneus.”¹

Speaking of the visual centre, James says that when this is destroyed there is every reason to believe that not only vision, but all *visual ideas* are destroyed also. The victim loses all power of visual imagination. Connected with this is mental blindness, which “consists not so much in insensibility to optical impressions as in *inability to understand them*.”² Thus in Alexia the patient is unable to read letters which he nevertheless can see. Similarly, the original centre of hearing is seated in the temporal lobe.

¹ *Brain and Personality*, 183-4.

² *Principles of Psychology*, i., 48.

"But a whole group of centers becomes developed afterwards around the original auditory centre, each one of which has learned what different kinds of sound mean."¹

Let one of these knowing centres be damaged, and the particular order of sounds to which it is related loses all significance to the injured man. Thus:

"An artist may be lost in admiration while gazing at the Sistine Madonna. An apoplectic clot may make him the next day, though still able to see that great picture, no longer able to distinguish it from a wall-paper. A trained musician may be entranced at one time listening to a symphony of Beethoven, but in a few hours, though still able to hear it, he may be wholly unable to recognise it as music."²

And here it must be noticed that, in man and the higher mammalia generally, there is a cross-relation between the brain and the body, so that each hemisphere is connected with the sensory organs and muscles of the *opposite* side of the body. Moreover—and this is important—it is also found that the working hemisphere (whichever it be) is associated with what may be called the "working" hand. Thus, in right-handed persons the *left* hemisphere will be the working hemisphere; in left-handed persons the working hemisphere will be the *right*. I shall recur to this subject later on (Chapter X.).

We shall now be able to appreciate the significance of a case of Sir William MacEwen's quoted by Dr. Thomson. The patient was a right-handed man, and his skull had been injured by a splinter.

"Immediately after the accident he was in a peculiar mental condition. Physically he could see, but what he saw conveyed no impression to his mind. Thus, an object presented itself before him which he could not make out, but when the object emitted sounds of the human voice, he at once recognized it to be a man who was one of his fellow-workers. He was equally unable to recognize his wife and children. By eyesight he could not tell how many fingers he held up when he placed his own hand before his face till he became cognizant of the number by the sense of touch. These symptoms gave the key to the hidden lesion in his brain, and therefore where to trephine his skull."³

It was found that a fragment of the skull had been driven into the grey matter of the visual area of the left cerebral

¹ *Brain and Personality*, 184-5.

² *Ib.*, 187.

³ *Ib.*, 180-1.

hemisphere. The fragment was removed, and the man recovered his lost faculty. But what was the faculty which he recovered ? Not that of sight, for he never lost it, but that of *knowing* what he saw. The injury in this case was caused to the *knowing* visual area—the precuneus in Dr. Thomson's words—of the working hemisphere. But the non-working hemisphere had an uninjured precuneus. Why could not this come to the rescue ? If mind is *merely* a product of the brain, and mental phenomena *merely* reactions of the brain to nerve stimuli, why should not one precuneus be as effective as the other ? The visual area in each hemisphere had been subjected to similar stimuli. From infancy upwards similar ether waves had impinged on the retina of either eye. In each hemisphere the primary centre of sight—*i.e.*, *mere* sight—was in full working order. Why should a knowing centre be formed in one hemisphere and not in the other ? Here, again, the answer must surely be that it has been formed by the action of some independent agency which uses the brain as an instrument.

Moreover, just as the respective senses are associated with special parts of the brain, so many, at any rate, of the mental faculties have special brain areas appropriated to them. Conspicuous among these is speech, and the faculty of speech is (physically) located in the third frontal convolution of the brain, commonly known as Broca's convolution. But in this case, too, we find that, though each hemisphere has a Broca's convolution, speech proceeds from that of the working hemisphere only. Here, again, there seems to appear the work of some creative agency independent of the brain, an agency which not only uses the brain as an instrument, but also fashions it to its purpose. It might be urged, perhaps, that the real fashioning force is the muscular activity of the hand associated with the working hemisphere. But the formation of a knowing centre or a speech centre must surely be the work of a *conscious* agency ; and apart from the difficulty of imagining how mere muscular activity could produce a mental faculty, there is some positive evidence against this supposition. Dr. Lewis C. Bruce records the case of a patient with two

alternating states of consciousness, whose motor functions were alternately regulated by his right and left hemispheres. In the one he was left-handed and spoke Welsh, in the other he was ambidextrous and only understood English.¹ Now, if the patient's faculty of speaking Welsh was caused solely by the activity of the left hand, there is no reason why it should be lost by the addition of right-hand activity. If it is only the brain—or, more correctly, Broca's convolution—that speaks, the patient should have continued to speak Welsh so long as the physical conditions necessary for this remained unimpaired. And the entry of what I may call the "English" convolution certainly did not destroy the powers of the "Welsh" convolution, for these reappeared at the next change of state. Consequently, since the brain was unaltered throughout, the change of faculty must have been due to something *behind* the brain.

It is surely more natural to suppose that appropriate muscular activity *prepares* the material for the creative agency—in fact, the mind—to work upon, as there is no doubt that physical exercise generally facilitates cerebral development. For the power of this agency is not limited, and it requires plastic material for its purpose. Thus it can work upon the young brain of a child more readily than upon that of an adult. For instance, loss of speech from paralysis of the working side of a child can sometimes be cured by teaching the non-working hemisphere to step into the breach; but where the brain has grown too old this cannot be done. Sir W. Gowers, M.D. (speaking of right-handed children) says:

"In children destruction of the left motor speech centre never causes lasting loss of speech, as it does in adults. However complete the loss may be at first, speech is regained and, before long, it is difficult to detect any imperfection. There must, therefore, be a capacity for the acquisition of voluntary speech processes on the right side of the young which there is not in the adult."²

More direct evidence, however, of the existence of such an independent agency is furnished by some of the phenomena of hypnotism. These point to the conclusion that

¹ *Brain*, 1895, vol. xviii., 54.

² Quoted, Jackson, *Ambidexterity*, 122.

the human self has a double aspect, a divided jurisdiction. Without prejudging the exact nature of this duality, which will be dealt with in a later chapter (Chapter XVIII.), it may be regarded for the present as a combination of two selves, or rather, perhaps, as two subdivisions of one regulative authority. These selves are variously described as primary and secondary, waking and subwaking, supra-liminal and subliminal, objective and subjective, conscious and subconscious.¹ Dr. Sidis says:

"The two selves in normal man are so co-ordinated that they blend into one. For all practical purposes a unity, the conscious individual is still a duality."²

Speaking broadly, the primary self is the self of reason and will, the self which constitutes the individuality of the person as known to his fellow-men. The secondary self, on the other hand, is concerned rather with the care and administration of the bodily functions, all of which seem to involve the presence of consciousness, but only of a subconscious order. The two, however, are closely allied.

"The life of the waking [primary] self-consciousness flows within the larger life of the subwaking [secondary] self like a warm equatorial current within the cold bosom of the ocean. The swiftly coursing current and the deep ocean seem to form one body, but they really do not. The one is the bed in which the other circulates. The two do not mingle their waters; and still, separate and different as the two are, they nevertheless intercommunicate. The warmth of the Gulf Stream is conducted to the ocean, and the agitation of the ocean is transmitted to the Gulf Stream. So it is with the two Selves. Apparently one, they are, in fact, two—the warm stream of waking self-consciousness does not mingle its intelligence with that of the subwaking self. But though flowing apart, they still intercommunicate."³

The secondary self apparently never sleeps; were it to do so the functions of the body would become deranged. Among other qualities it has a prodigious memory, and it is extremely sensitive to suggestion. It is this self which

¹ I adhere for the present to the terminology adopted by previous writers by which the human mind structure is treated as consisting of a primary and secondary *self*, but without accepting it as necessarily correct.

² *Psychology of Suggestion*, 162.

³ *Ib.* 162.

comes to the surface in hypnosis, when the primary self is in temporary abeyance; and under these conditions the control of the secondary self over the mechanism of the body is shown in the most amazing fashion. Blisters and pustules can be raised by suggestion on the subject's skin; bleeding can be similarly produced; menstruation can be excited or arrested, as well as the action of the bowels and the secretion of milk, and the various senses can be stifled or rendered preternaturally acute (anæsthesia and hyperæsthesia). In the same way therapeutic effects can be produced, and pain and disease banished. Myers quotes a most interesting experiment of Delbœuf's in which one of two symmetrical wounds was rendered painless by suggestion.¹ So, too, a hypnotised subject may be told that he will not when he awakes perceive a particular person in any way, and the secondary self takes care that this suggestion is carried out. Binet quotes an experiment of this kind on one Elise B. in which the subject

"realised everything to perfection. Logical in her delusive conception, she apparently did not perceive me with any of her senses. It was useless to tell her that I was there, and that I was talking to her. She was convinced that they were simply making fun at her expense. I gazed at her obstinately, and said: 'You see me well enough, but you act as if you did not see me. You are a humbug; you are playing a part.' She did not stir, and continued to talk to other people."²

Or, again, a minute mark may be placed on one of several precisely similar pieces of paper, and the subject told that he shall not see the marked one. Here, too, the suggestion will be faithfully carried out.

Now, it is absolutely inconceivable how such phenomena as these could take place if mind be merely a product of matter. For it must be remembered that an hypnotic effect is not something forced upon the subject by the will of the operator, but something evoked by the mind of the subject exercising its own powers at the suggestion of the operator.³ And this suggestion is not addressed to muscle,

¹ *Human Personality*, Abridged Edition, 141.

² *Alterations of Personality*, 305.

³ Milne Bramwell, *Hypnotism*, 337, 346; Hollander, *Hypnotism and Suggestion*, 55, 215, 276.

or nerve, or cell, or brain, but to a consciousness. Mind speaks to Mind, and is answered. When the secondary self sets to work to cure a pain or produce a blister it is plainly not a product of the working of the material mechanism of the body, but an outside influence interfering with that mechanism. In the case of the pain, this may in certain cases be relieved by means of induced anæsthesia, the secondary self in some manner intercepting the passage of the sensation to consciousness. Here the sensation and its causes will not be directly interfered with. But when a blister is raised or a secretion produced, the secondary self must obviously set in motion some appropriate physical machinery to produce the required alteration in the working of the bodily mechanism. In neither case is the interference effected by the operator. He only suggests the result to be accomplished; he does not suggest the method whereby it is to be achieved. He could not if he would, for he does not know what this method is. He suggests that the toothache shall cease, or a blister be raised, or a secretion produced, but he has not the faintest idea of the means whereby the physical sensation is intercepted before it reaches the consciousness as pain, or of the alterations or derangements of the vital activities of the body by which the other effects are brought about. This knowledge belongs to, and is applied by, the secondary self alone. It is therefore, as has been said, a case of mind speaking to mind. The suggestion is addressed, not to a muscle, or nerve, or cell, but to the secondary self, and that self decides how it is to be carried out.

"In a word, it is plain that in this class, as in other classes of suggestion, we are addressing ourselves to a *mind*, an *intelligence*, which can of itself select and combine, and not merely to a tissue or a gland responsive in a merely automatic way."¹

Again, returning to the cases of non-perception given above, when the subject is unable to perceive the specified person or the marked piece of paper, it is obvious that he must nevertheless *distinguish* them in order to carry the suggestion into effect. Though the consciousness is constrained, the senses are not. In fact, the subject sees what he does not seem to see, and hears what he does not seem

¹ Myers, *Human Personality*, Abridged Edition, 140.

to hear. It is the secondary self which sees and hears, while the primary self is occluded from any perception. Here, again, the secondary self obviously stands out as an independent agent, interfering with the ordinary course of the bodily processes, and preventing the knowledge from coming within the ken of the primary self. Facts like these cannot be ignored, and whatever the true account of them may be, they certainly cannot be explained on Materialistic principles. Materialists insist that the only valid conclusions are those which are based on solid facts. Yet we find that, in dealing with mind, they declare it to be a property of a particular kind of matter. Now, this is not a proved fact, but an assumption. For if they confine themselves to the *facts* of the situation, these only show that mind is found to coexist with this particular kind of matter. The combination of mind with brain-tissue is the only fact given them, and their declaration that the former is a property of the latter is at best no better than an inference. Moreover, even if their theory were possible, it does not seem to be probable. For if all mental faculties arise from reactions of the material brain to nerve stimuli, why should there be a knowing area in one hemisphere and not in the other? Each eye, for instance, with its appropriate brain area, responds to precisely similar waves. Each eye sees: why does not each eye acquire a similar knowing area? Again, the operations of the secondary self which interfere with the material functions of the body show that mind cannot be merely a product of those functions or some of them. On the other hand, these facts can be made intelligible by referring them to the operation of some external agency.

On the whole, then, there seem to be better grounds for affirming the existence of an independent soul than for denying it, and for regarding this soul as a definite and permanent element in the cosmic system, rather than as a by-product of the activities of cerebral tissue. The probabilities, in fact, are here on the side of the angels, and we need not hesitate to accept a conclusion which all our higher instincts confirm. The beginnings of the soul are humble, its first appearance is obscure; but it contains within itself the possibilities of a greatness upon which even imagination itself cannot venture to impose a limit.

CHAPTER IV

MATTER AS KNOWN TO US

WE have now considered some of the grounds on which our faith in the existence of a soul may rest, and before proceeding to discuss its origin, development, and character, we may usefully turn our attention once more to the matter in which it is manifested, but with which it is apparently so sharply contrasted. It has been shown (Chapter II.) that matter is, for us, a generalisation framed by the mind out of the impressions made upon the senses by an external something. This is the philosophical explanation of matter and it adequately indicates the origin of our conception of matter. It does not, however, carry us very far towards an understanding of matter in its relations to ordinary life. For this we must turn to some physical explanation of it, some explanation which will tell us of the character and properties of the matter with which human experience has to deal. Now, the soul, whatever its true nature may prove to be, is at any rate alive, and is endowed with all the activity of a living being. Matter, on the other hand, according to the popular view, is chiefly distinguished by its inertness. As contrasted with the mobility of animate existence, matter seems to be entirely quiescent and inactive.

Appearances, however, are deceptive; and when we come to look a little below the surface we shall find that matter is by no means motionless or inert.

Matter even *en masse* is profoundly unrestful, and the most solid block of it throbs through and through with motion of intense activity. In the first place, its molecules are incessantly swinging to and fro, and thus the mass which is composed of them is in a perpetual state of internal commotion. According to Professor Duncan,

"It is doubtful that there is such a thing as rest even in a relative sense. The very particles that constitute the materials of our so-solid-seeming earth, that seem so fixed and at rest relatively to one another, are in a state of perpetual unremitting quiver—what we call temperature—and that quivering, had we eyes but big enough to see it, is very far indeed removed from rest."¹

Carl Snyder tells us a similar story:

"Could our eyes open on this molecular world, we should have the laugh on the old-time theologians and their quaint ideas of 'dead' matter. We should find the molecules of the quiet air speeding about with the velocity of a cannon-ball; a drop of water would resemble a thick swarm of bees, pounding against each other in their flight with tremendous force. Even the crystalline diamond would seem like pyramids of billiard-balls, hung wide apart by invisible springs and gyrating intensely."²

"The paper on which I write [says Dr. Macfie] is really seething like the sea."³

In liquids the same process goes on, and here the molecules have a somewhat freer range. In gases this activity is still more marked. For instance, molecules of nitrogen travel at the rate of a quarter of a mile a second, or thereabouts, the speed of oxygen molecules being somewhat lower. But, in addition to these comparatively large movements, every gas molecule vibrates incessantly.

"It has been calculated that a molecule of hydrogen vibrates four hundred and fifty million million times a second, representing a distance in to-and-fro movement of about one mile."⁴

It is also possible that every molecule revolves on its own axis.

And here it may not be amiss to point out how small is the size of the individual molecule, and how enormous the numbers of the molecular host.

"One of the smallest infusoria known is the *Monas Dallingeri*, which is about $\frac{1}{8000}$ of an inch in diameter. Each of its spores is an independent living organism, not larger than $\frac{1}{80000}$ of an inch, and yet contains 268 millions of molecules."⁵

It would require some 250,000,000 molecules of water to extend to the length of an inch; and "a cubic centimetre

¹ *The New Knowledge*, 5.

² *New Conceptions in Science*, 121.

³ *Science, Matter, and Immortality*, 49.

⁴ *Ib.*, 49.

⁵ Carr, *Matter and Some of its Dimensions*, 7.

of water is estimated to contain a number of molecules which would be represented by the figure 3 followed by twenty-two ciphers."¹ Lord Kelvin calculated that the average diameter of a molecule of the chemical "elements" is about $\frac{1}{25,000,000}$ of an inch, and that a single blood-corpuscle contains about 3,625,000,000 molecules. Dr. Macfie brings the case before us by a vivid illustration:

"It might also be safely asserted that a molecule on the point of a needle would belike a midge on the summit of the Matterhorn; and that the molecules in a tear would exceed the population of the world."²

But we have not yet exhausted the movements of matter. We have noted the various kinds of *molecular* motion; but the molecule is composed of *atoms*, and these atoms not only vibrate within the molecule, but display an elaborate internal activity of their own. Small as the molecules are, their component atoms are, of course, smaller still. According to Sir Oliver Lodge, the smallest piece of matter which could be detected by a microscope of the highest power would contain a billion atoms.³ It has been estimated that there are 250,000,000,000,000,000 cells in the human body, and that the smallest of these contain 100,000,000 atoms;⁴ and 30,000 billions of hydrogen atoms (the smallest) would find ample room in a moderate sized pin's head.⁵ As originally conceived an atom was, as the name implies, something incapable of division. But as at present understood an atom does not mean an actual ultimate indivisible particle, but a theoretically ultimate particle of chemical reaction. Thus, an atom, say, of iron is, according to the atomic theory, the smallest bit of iron which will continue to display the chemical properties of iron. If conceivably it were to be broken up into something smaller, the fragments into which it was broken would cease to be iron. But nevertheless the chemical atom may very well be itself built up of smaller particles of—*something*, and with such smaller particles the atomic theory does not—directly, at any rate—concern itself.

¹ Kingsland, *Scientific Idealism*, 58.

² *Science, Matter, and Immortality*, 45.

³ *Ib.*, 45.

⁴ Fournier, *New Light on Immortality*, 53.

⁵ McCabe, *The Evolution of Mind*, 5.

Now, the recent discovery of radioactivity has disturbed all previous theories about the nature of matter, and has thrown a sudden light on this *something*, thereby revealing the nature of those smaller particles of which the atom is found to be composed. It was discovered that radium and some other substances emit peculiar radiations, certain of which have been named the Alpha, Beta, and Gamma rays respectively. We need not here follow out the full history of these radiations, interesting as it is, but may confine our attention to the Beta rays. These consist of particles (the smallest known to us) which are charged with negative electricity, and are shot out from the radium at rates which vary from 75,000 to 150,000 miles a second.¹ These particles are called "corpuscles," or more commonly "electrons"; they are all precisely alike, and it is believed that every atom of matter contains large numbers of them. Thus, the hydrogen atom, which is the lightest of all atoms, is supposed to contain 1,000 electrons, while heavier atoms contain more. To get some idea of the relative dimensions of the atom and its electrons, "picture the interior of St. Peter's Church at Rome filled with 1,000 grains of sand darting about in its vast interior."² Thus the electrons have plenty of elbow-room, which they appear to utilise in a very remarkable manner. It is now generally supposed that the electrons in every atom form themselves into a miniature solar system, revolving in regular orbits, each electron also revolving on its own axis.³

Thus Matter, which appears so inert, is actually convulsed with movement of the most complicated kind.

But in the light of recent researches we can go further still; for it now seems that Matter not only contains motion, but, in a certain sense, *is* motion. In discussing the process of radioactivity, the Beta rays were treated as particles of matter charged with negative electricity. Apparently, however, this description must be modified. Professor Rutherford refers to some experiments of Kaufmann which

¹ Duncan, *The New Knowledge*, 108.

² Carr, *Matter and Some of its Dimensions*, 16.

³ *New Conceptions in Science*, 160; *Science, Matter, and Immortality*, 84; Hampson, *Radium*, 61; Fournier, *Two New Worlds*, 84.

showed that the apparent mass of an electron increased with its speed. From this Kaufmann concluded that the apparent mass of a Beta particle was *entirely electrical* in origin, and that there was no necessity to assume the presence of a material nucleus on which the charge was distributed: in fact, that the Beta particles "are not matter at all in the ordinary sense, but disembodied electrical charges whose motion confers on them the properties of ordinary mass."¹ Upon this conclusion Rutherford observes:

"This was a very important result, for it indirectly offered a possible explanation of the origin of mass, which has always been such an enigma to science. If a charge of electricity in motion exactly simulates the properties of mechanical mass, it is possible that the mass of matter in general may be electrical in origin, and may result from the movement of the electrons constituting the molecules of matter."

He adds:

"Such a point of view, while most suggestive and important, cannot at present be considered more than a justifiable speculation."²

The same view, however, has been adopted by other scientists. Professor Duncan, for instance, tells us that "matter in its last analysis is identical with electricity," and that "mass, or quantity of matter, is simply the ether carried along by the corpuscle in its motion." In other words, it is the velocity of this "bound" ether, as he calls it, which constitutes mass, and consequently mass varies with corpuscular velocity.³ Mr. Carr gives the following illustration of this view:

"Place a mass of quivering jelly upon a table, plunge a knife into each side, and give the knives a twist in opposite directions. A strain, or stress, or torsion exists between the points of the knives, but in no sense can the stress or torsion be considered matter. Now move the stress around a central point in the mass of jelly, and a certain amount of bound jelly will be carried along with the stress, and the moving, bound jelly, because of the motion, will have weight, or mass, or inertia. Increase the speed of rotation of the stress, and the mass of the bound jelly will also be increased. In like manner we may conceive an exceedingly small vortex moving in the ether. This moving vortex, or electron, will carry along with it a certain amount of bound ether, which will increase as the motion

¹ *Radioactive Transformations*, 10, 260.

² *Ib.*, 11.

³ *The New Knowledge*, 187.

of the electron is accelerated. Thus it appears that mass, so called, is a function of speed, since the greater the motion of the electron, the greater the amount of bound ether, the greater the mass or inertia."¹

"We are therefore entitled" (says Professor Duncan) "to believe, if we like, that the *whole* mass of the corpuscle arises from its electrical charge. But the corpuscle we deem to be the constituent of an atom, the atom the constituent of a molecule, and a molecule the constituent of a mass of matter, such as a table or a chair."²

So, too, Le Bon says:

"When we study the structure of the atom, we shall arrive at the conclusion that it is an immense reservoir of energy solely constituted by a system of imponderable elements maintained in equilibrium by the rotations, attractions, and repulsions of its component parts. From this equilibrium result the material properties of bodies, such as weight, form, and apparent permanence. Matter also represents movement, but the movements of its component elements are confined within a very restricted space."³

So, too,

"there is no separation between matter and energy, since matter is simply a stable form of energy, and nothing else."⁴

And again:

"Electricity under various forms is always met with as the ultimate product of the dissociation of matter, whatever the process employed for its dissociation."⁵

Lord Kelvin, Sir Oliver Lodge, and others, have put forward similar theories as to the electrical (and therefore imponderable) origin of what we know as ponderable matter.

And thus another blow is dealt at our original notion of matter. First we fancied it to be absolutely inert. We then found it to be throbbing with motion. We are now told that it is nothing but motion—the motion of something which is not itself material in the ordinary sense, while its qualities are also apparently due to the motion of its component electrons. According to the electronic theory of matter, the atom acquires its solidity, and preserves its integrity through the conflicting strain of the positive and

¹ *Matter and Some of its Dimensions*, 10-11.

² *The New Knowledge*, 184.

³ *The Evolution of Matter*, 10. ⁴ *Ib.*, 12. ⁵ *Ib.*, 199.

negative electrical units which compose it; just as a bent bow preserves its rigidity through the contending strains of the wood and the string.

But this condition of stable tension is only preserved by the immense velocity with which the electrons speed along their orbits within the enclosing atom. To this the atom owes not only its permanence, but its form, its solidity, and its other material properties. Shape, in fact, is due to the rapid *motion* of something which has no shape; hardness to the rapid *motion* of something which is not hard. But if once this rotational velocity falls below a certain point, the tension forthwith becomes relaxed, and there is a partial breakdown of the system. Some of its constituents are expelled with tremendous velocity, the others re-group themselves into a new system. This, indeed, is the explanation of radioactivity. But till some such breakdown occurs the whirl of the negative electrons in the atom is balanced by an equal distribution of positive electricity, probably in the shape of an enclosing sphere.¹ Or, as Rutherford puts it, "the mobile electrons constitute, so to speak, the bricks of the atomic structure, while the positive electricity acts as the necessary mortar to bind them together."²

In the Beta rays of radium we see matter, as the result of atomic disintegration, passing away as electricity, the ponderable passing over into the imponderable. And the process whereby this is effected is as mysterious as the result which is produced. For the purposes of chemistry the atom is the ultimate constituent of matter as known to us. It is the smallest unit which can enter into chemical combination. It could not be broken up without losing its special character. Yet in its tiny self the atom is a tower of impregnable strength. So vast are the strange forces which bind its component parts together that no agency which we can invoke can tear them asunder.

"An English scientist recently stated that if one gram of radium could be instantly and completely dissociated, it would unlock

¹ Duncan, *The New Knowledge*, 171.

² Rutherford, *Radioactive Transformations*, 266.

sufficient energy to throw the whole British fleet from the Channel to the top of Mont Blanc."¹

But lest radium should be deemed to be a special case only, let us take, as another example, the atomic energy of the lightest of all elements—hydrogen.

"Professor Thomson, as the result of his calculations, concludes that a gram of hydrogen has within it energy sufficient to lift a million tons through a height considerably exceeding one hundred yards; and that since the amount of energy is proportional to the number of corpuscles comprising the atom of the element, the energy of the other elements, such as sulphur, iron, or lead, must enormously exceed this amount."²

Yet the Beta rays reveal the atom disintegrating apparently of its own accord, and, strange to say, without any regard to ordinary chemical laws.

"The disintegration of the radium atoms goes on at a definite rate without our interference, or the possibility of our interference, either in starting or stopping it. Heating the substance in no way accelerates the development of energy, cooling it causes no diminution. Even chemical combination and decomposition make no difference."³

Here, then, we seem to have passed beyond the chemistry of matter as known to us into the presence of what, perhaps, may be a *super-chemistry*, operating on different materials and under different laws. So far I have dealt exclusively with the Beta rays. But it is worth noting that in some other respects radium seems to be on the border-line of a different realm. Thus the Alpha rays, and another emission called its "emanation," both ultimately become helium, one of the so-called "inert" gases which have no chemical properties.

Indeed, there seems some reason to suppose that when we reach radioactivity we not only rise above the laws of ordinary chemical action, but also approach nearer to the mysterious energy of life. Professor Oskar Hertwig found that radium produced the most devastating effects on the spermatozoa of frogs which were exposed to it, acting rather like a living disease than an inorganic poison.

¹ Carr, *Matter and Some of its Dimensions*, 25-6.

² Duncan, *The New Knowledge*, 176.

³ Hampson, *Radium*, 63.

"A chemical poison" (as he remarks) cannot increase itself in the developing ovum; the more it is divided and attenuated, the more harmless it becomes. Everything points to the conclusion that the radium rays work like a *contagium vivum*; that what we have here is no chemical or mechanical alteration, but the disturbance of a specific life-process."¹

And now the question comes, What is the electricity into which matter is ultimately revolved? The answer is not easy. Electricity is a movement or perturbation of something; and this something is, in its turn, called ether. But ether, again, is a most elusive mystery, and its properties are rather a matter of inference than of observation. It is something which is at once necessary and unintelligible. We cannot explain it, yet we cannot dispense with it.

"Although the inmost nature of the ether is hardly suspected, its existence has forced itself upon us long since, and appears to many to be more assured than that of matter itself."²

Its existence is conclusively proved by the phenomenon of light, which is propagated by means of waves, and these, of course, must be waves of something. Yet this something can hardly be a gas, for gases are compressible, while ether is incompressible by any power at our disposal.³ "It must possess a rigidity exceeding that of steel, or it could not transmit luminous vibrations at a velocity of 300,000 kilometres per second."⁴ Yet it can hardly be a solid in the ordinary sense of the term. Lord Kelvin regarded it as an elastic solid permeating space. Most authorities consider its density to be slight, but all agree that it is imponderable. Le Bon sums up the position thus:

"If we know very little about the ether, we must, however, consider it certain that the greater part of the phenomena in the Universe are the consequences of its manifestations. It is, no doubt, the first source and the ultimate end of things, the substratum of the worlds and of all beings moving on their surface."⁵

¹ *Die Radium-Krankheit Tierischer Keimzellen*, Times Literary Supplement, October 12, 1911.

² Le Bon, *The Evolution of Matter*, 87.

³ Mendeléeff, however, has put forward a theory that ether is one of the inert gases of the Argon family, a million times lighter than hydrogen.

⁴ *Ib.*, 89.

⁵ *Ib.*, 92.

Hampson, with equal emphasis, declares that "all matter, in whatever form or quality, whether mass, molecule, atom, corpuscle, or universe-vibration-medium, is ether."¹

It seems, then, that we have now tracked matter up to a point where it almost ceases to be material, and where it appears to melt away into something which defies our comprehension. Ether, in fact, can hardly be defined at all in terms which are applicable to ordinary matter. Yet we are forced to regard it as the reality which underlies, not only matter, but also light, heat, electricity, magnetism, and the other physical energies of the world in which we live. We perceive its effect, but we cannot pry into its nature; we can only postulate it as a "Medium of extreme tenuity and elasticity, diffused throughout all space."²

The primal substance, therefore, of ponderable matter is an imponderable something; and ponderable matter is formed by the action of some power moving through this something in the form of an electrical discharge.

¹ *Radium*, 96.

² Duncan, *The New Knowledge*, 250.

CHAPTER V

THE CONDITIONS OF LIFE

WE have now arrived at a general idea of the character and properties of inanimate matter. We have seen that, in spite of its apparent inertness, it is actually seething with a multitude of unsuspected activities, to which it owes its familiar material properties. But beyond this inanimate and inorganic matter lies the still more mysterious realm of living organic existence. The apparent distinction between the two is sharp and obvious, and until comparatively recent times it was supposed to present an unpassable barrier. Indeed, in spite of all theories to the contrary, it is still true that among all the activities manifested by inorganic matter we can find none which are competent to originate life. Organic compounds, including even a few proteins, have, no doubt, been artificially constructed in the laboratory, but no chemist has made these synthesised products live. Yet, if life be a product of evolution, it must at some point arise in inanimate matter. Matter which was previously non-living must somehow at this point have become endowed with life. Accordingly, we may gain some clue to the nature and origin of life if we examine the material conditions under which it first appears.

The two essentially distinctive properties of living matter are the power of growth and the power of reproduction. The powers are found only in a form of matter called protoplasm, which is composed chiefly of the four familiar elements, carbon, hydrogen, oxygen, and nitrogen. Besides these four, the following elements are found in small quantities in its composition: sulphur, iron, phosphorus, chlorine, sodium, potassium, calcium, and magnesium. In its simplest form it shows no visible structure, but it is sup-

posed to have a very minute framework of a foam-like or net-like character. The interstices of this framework are supposed to be filled with a material which, though similar in composition to protoplasm, is not living. Protoplasm, however, is not a definite chemical compound: it is a mixture of several substances—*i.e.*, proteins, mineral salts, and water. Its chief feature is its restless internal activity: it is never still, never stable. It is perpetually building itself up, breaking down, and rebuilding itself again. Reynolds Green writes:

“The great characteristic of protoplasm is its instability; it is continually undergoing decomposition and reconstruction. Some of the residues of its breaking down are capable of being built up again into its substance; others are thrown off from it. Of these, some are eliminated entirely from the organism, others are retained within it to carry on some of the more subordinate processes of its life or its nutrition.”¹

In its earliest stage it is just a tiny mass of semi-fluid jelly, without the cell wall or nucleus which appear higher up in the scale of life, though as a rule it rapidly develops into some low organic form. One of its peculiarities is the Protean versatility with which it can change its character by simply altering the arrangement of its chemical constituents. These constituents are in all cases the same, but the varieties produced by different groupings of them are almost endless. The interest of this biological feature is that it reproduces, or at any rate closely imitates, the Isomerism of Chemistry. Isomeric² substances are substances composed of the same chemical constituents and in the same proportions, but which present different properties owing to their molecules being differently arranged. Allied to the Isomerism, which occurs in chemical compounds, is the Allotropism³ occasionally found in the so-called chemical “elements,”⁴ which enables them to assume different forms by means of similar molecular rearrangements. Thus, the element carbon appears not only as pure

¹ *The Soluble Ferments and Fermentation*, 7.

² ἴσος, equal; μέρος, a part.

³ ἄλλος, other; τρόπος, a mode.

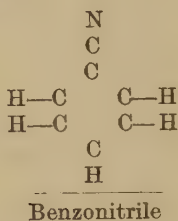
⁴ A compound is a substance whose molecule contains two or more kinds of atoms; an element is a substance whose molecule contains only one kind of atom.

charcoal, but as anthracite, plumbago, and diamond. These substances, though distinct in appearance and properties, are chemically identical. Phosphorus, silicon, arsenic, oxygen, and sulphur, also appear in allotropic forms. Many of the carbohydrates are isomeric in composition. But in the world of actual life we find Isomerism, or something like it, on a very large scale. "Protein, for instance, according to Professor Frankland, is capable of existing under probably at least a thousand isomeric forms."¹

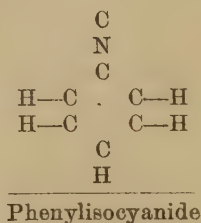
Now, we may gain from Isomerism and Allotropism a valuable hint as to the hidden processes of Nature's factory. They show us that the variety of Nature may arise not only from the variety of her materials, but also from the almost infinite variety of their arrangement. So we may see in a kaleidoscope an ever-changing series of figures which all spring from successive rearrangements of the same things. In order to make something new, no new force, no fresh substance, is called into existence. Nature simply redistributes and recombines the components of something already to her hand. Thus, differences of property or quality are ultimately due to differences, so to speak, of *architecture*. It is necessary to appreciate this fact properly, for it is the key to a due understanding of things as they appear to us. To the thought of an older day difference of quality meant difference of substance. But with our wider knowledge of Matter, we now perceive that the qualities of a thing are due, not only to the constituents of which it is composed, but to the internal arrangement, also, of these constituents. Isomerism brings this out very clearly. For example, dextrine (a gum), starch, and cellulose, substances which differ considerably from each other, all have the formula $C_6H_{10}O_5$ —that is to say, their respective molecules each consists of 6 atoms of carbon, 10 of hydrogen, and 5 of oxygen. Butyric acid, which produces the distinctive odour of rancid butter, has a compound composition identical with that of acetic ether, which has the agreeable fragrance of apples. Each consists of the same elements—carbon, hydrogen, and oxygen—in the same proportion, the chemical formula of each being $C_4H_8O_2$. But since

¹ Bastian, *Nature and Origin of Living Matter*, 69.

their properties are different, the difference must be due to the mode in which their atoms are grouped. A striking instance of a great difference in quality produced by a very minute alteration in atomic arrangement is furnished by two substances, Benzonitrile and Phenylisocyanide. Each is composed of 1 atom of nitrogen, 7 of carbon, and 5 of hydrogen. In Benzonitrile these are grouped somewhat in the following manner:



Now, Benzonitrile is a harmless fluid diffusing an aroma of bitter almonds. But if the position of the Nitrogen atom be shifted thus—



we get Phenylisocyanide, which is highly poisonous, and has a most offensive odour.¹

It is clear, therefore, that the qualities of things depend upon structure fully as much as upon the nature of their constituent atoms. And even with the atoms the same law obtains. For every atom is composed, as we have already seen (Chapter IV.), of electrons, and these electrons are *always the same* whatever be the substance—oxygen, carbon, iron, etc.—of the atom in which they are found. Consequently the different characters of the various atoms must be ultimately due to differences of number and arrangement in the electrons within the atoms—in other words,

¹ Quoted by Wallace (*The World of Life*, 356) from a lecture by W. Bate Harvey.

to atomic structure. All quality, therefore, ultimately depends upon structure. It is easy to understand, then, that substances which are very elaborately built up will have a larger variety of qualities, and wider possibilities of function than simpler compounds, and consequently that, in such a highly elaborate substance as protoplasm, life itself may be not necessarily the *product*, but the *reward* of its complexity.

Let this aspect of the question be carefully borne in mind, for it illustrates what I conceive to be one of the great laws of our development. The higher gifts of evolution are not bestowed at the caprice of an arbitrary power, or upon objects unfitted to receive them. If a stone were suddenly to be endowed with life, we might marvel at the miracle, but we should inwardly condemn the judgment which permitted it. We should feel that the production of a grotesque monstrosity, though it might attest the power, would be injurious to the dignity of an intelligent Creator, and we should lose in reverence what we might gain in awe. All the prizes of progress are truly ours to gain, but when, and not till when, we have ourselves become worthy of them.

Returning, therefore, to protoplasm; the speck of jelly above described is called a cytode or plastide, and must be regarded as the lowest and simplest form of living matter within our powers of apprehension. There may possibly be supramicroscopical living forms, like the physiological units of Herbert Spencer or the biophors of Weismann, but for our present purpose it is not necessary to consider these. Their existence is only hypothetical, and the reasoning which applies to the cytode would apply to them also. Life may perhaps appear in some form previous to the cytode, but we can only begin to investigate it at the point where we can first detect it. The cytode is not distinctively either animal or vegetable in character, and belongs to the class called by Haeckel the *Protista*, being an intermediate class between animals and vegetables proper, or perhaps, rather, a fundamental class from which they both spring. In the simpler forms of life it is sometimes difficult to decide whether a given form is animal or vegetable, and it is not uncommon to find animal forms

with vegetable characteristics. Chlorophyll, a substance which gives plants their green colour, is one of the most distinctive features of the vegetable kingdom. By means of it plants are enabled to assimilate and break up the carbon dioxide required for their maintenance. Bacteria are on the border-line between animal and vegetable, but some of the sulphur bacteria contain a purple colouring matter, called bacterio-purpurin, which fulfils the same purpose as the chlorophyll of the higher plants. Among the Infusoria, however, *Paramecium bursaria*, though clearly an animal, is found to contain chlorophyll,¹ and, according to M. Bergson, even some caterpillars and chrysalids possess an "equivalent of the chlorophyllian function."²

But protoplasm in all its forms, animal, vegetable, or intermediate, possesses the essential qualities of living matter, which, as we have seen, are the power of growth and the power of reproduction. Now, the first condition of the power of growth is a power of assimilation—a power, that is to say, whereby a living thing is enabled to appropriate from its surroundings materials which can subsequently be converted into the protoplasm of its own body. This process takes place in the lowest as in the highest forms of life. Nutrition is a primal necessity for them all. Consequently all alike are attracted by food, but the nature of the attraction is very different to the man and to the cytode. Man is attracted to food primarily by the cravings of hunger; and these are the cravings of an organism, cravings into which consciousness enters. The attraction to food is, in his case, an organic attraction, the object in view being nutrition. In the case of the cytode, however, it seems probable that the attraction is often more of a chemical than of an organic nature, resembling rather the "affinities" of inorganic chemistry. M. Bergson says: "Of phenomena in the simplest forms of life, it is hard to say whether they are still physical and chemical, or whether they are already vital."³ Thus, bacteria are strongly attracted by a solution of potassium chloride. Fischer states that Pfeffer, by means of some elaborate experiments

¹ Jennings, *Lower Organisms*, 142.

² *Creative Evolution*, 120 n.

³ *Ib.*, 104.

as to the attractive influence of food on bacteria, was able to show that

"the nutritive value was not the sole and only determinant, but that other more recondite factors were involved, based on the chemical constitution of the substance employed as a stimulant. For this reason he introduced the now generally adopted expression, chemotaxis."¹

Certain substances, again, have the power of repelling bacteria, and this is called negative chemotaxis. But, as the same author points out,

"in the case of negatively chemotactic compounds, the poisonousness of the substance is no more a criterion of its repellent power than the food value is an index of the attractive power in positively chemotactic bodies. For instance, a solution of 0.019 per cent. potassium chloride plus 0.01 per cent. mercuric chloride attracts bacteria by reason of the potash it contains, but they rush into the tube only to meet their death from the mercury salt."²

Chemotaxis may be rendered "an arrangement on chemical lines," and it expresses a *chemical* attraction or repulsion exercised on living forms—e.g., the attraction of the leukocytes of the body to the bacilli collecting in a wound, or to some other irritant substance. It is more like a chemical affinity than a physiological response to stimulus. Though it operates in living matter, it seems to follow the laws of inorganic matter. The influence which draws the cytode to its food is not the craving of the hungry man for the loaf: it is not even the desire of the moth for the star; but it resembles the impulse which drives oxygen and potassium into impetuous combination. Of course, this chemotactical attraction must soon become connected with the requirements of nutrition or the creature would perish. Cytodes which were habitually attracted to in-nutritious or poisonous substances would suffer extinction as the penalty. But this does not really affect the conclusion that the attraction originally arose in virtue rather of the chemical constitution of the cytode than of its properties as living matter.

Again, many of the lowest forms of life display movements which appear to be spontaneous. It seems, however, from

¹ *Structure and Functions of Bacteria*, 78 (translation).

² *Ib.*, 79.

experiments, that these movements are usually associated with the presence of oxygen. Bastian writes:

"Verworn has shown that if free oxygen is withdrawn from an infusion the movements of Amœbæ and other low organisms gradually cease; but that, even after many hours, the re-addition of oxygen causes their several movements to recommence. Oxygen acts like this upon all sorts of cytodes and unicellular organisms, and, as Le Dante says, 'It is very probable that the majority of the normal movements of plastides are due to the constantly changing distribution of oxygen in the infusions.'"¹

Similarly, those aerobic bacteria which are capable of movement are attracted by oxygen, but this is described by Fischer as "only a special instance of chemotaxis."² The oxygen acts on them, but their movements are rather a chemical than a vital reaction to its stimulus; and, in short, we might almost say that they are moved rather than that they move. Indeed, many apparently vital effects seem to be in reality chemical. The perpetual internal activity of protoplasm "appears at first sight to be an essentially vital phenomenon, but it is probably merely the mechanical result of chemical and physical processes going on in the cell."³ Even the nucleus of the living cell was regarded by Spencer rather as a stimulating than as a regulating centre, and Le Dante considers its action to be chemical rather than organic. It seems probable, too, that the attraction of spermatozoon and ovum—sperm-cell and germ-cell—to each other is of a chemical character, as is also the impulse to cleavage given to the ovum by the entrance of the spermatozoon.⁴ Loeb, indeed, considers that the whole process of fertilisation is of a chemical character, the development of the egg being the result of oxidation.

Conversely, among inorganic substances we find properties which seem to foreshadow vital functions. Pflüger says that cyanic acid might almost be described as a semi-living molecule, owing to its tendency to grow by concatenation of atoms. Metals are found to display irritability and fatigue. Gold and platinum, in a state of fine division,

¹ *Nature and Origin of Living Matter*, 31.

² *Bacteria*, 62.

³ Dendy, *Outlines of Evolutionary Biology*, 62.

⁴ Wilson, *The Cell*, 197.

operate to some extent like those mysterious bodies, the ferments, which can break up other substances without entering themselves into the reactions which they set up, without undergoing any alteration themselves from the changes which they provoke, and without being destroyed by their own activity.¹

In a process so apparently rigid as crystallisation many substances, both simple and compound, will, under varied conditions, crystallise in forms which belong to two or three systems of crystallisation, thus showing some signs of that adaptability which is so conspicuous in protoplasm.

Bütschli has shown that if a little oil be added to some powdered salt or sugar, and a drop of the mixture studied under the microscope, this will show a foam-like structure similar to that of protoplasm. Moreover, the drop will display amoeboid movements. As to this Professor Dendy observes:

"The substance of which these droplets are composed is, of course, totally different chemically from protoplasm, and is in no sense alive; but it seems highly probable, if not certain, that since purely physical processes (amongst which surface tension seems to play an important part) are capable of producing strikingly amoeboid movements in the oil-foam, they may also be largely, if not solely, responsible for the similar phenomena of movement in the living protoplasm of the *Amoeba* itself, which seems closely to resemble an oil-foam in its physical properties."²

In some experiments made before the Physical Society (January 23, 1914), Dr. Darling showed how some of the phenomena of life were mimicked by drops of different liquids.

"He covered a glass of water with a series of globules, which exhibited the commonly seen rapidly pulsating movement. Among them Dr. Darwin let loose a large drop that for a moment rested almost motionless upon the surface layer of the water. It then began to exhibit surprising activity, throwing out processes like those of the amoeba as quickly as the eye could follow them, and engulfing the other globules. The big globule drove the others from it in confusion, at times chased them round the water surface, then rested for a moment, only to renew the attack a few instants later. Eventually, Dr. Darling explained, the whole came to rest

¹ Green, *The Soluble Ferments and Fermentation*, 13.

² *Outlines of Evolutionary Biology* 19.

with the big globule lying placidly in the centre, as if quite satisfied with its many meals. The exact causes of the phenomenon were uncertain, but the results were strikingly analogous to those seen in some of the simpler forms of life."¹

Even reproduction, which seems so pre-eminently special to living matter, has its analogue in the realm of the non-living. In the case of the cytode, reproduction is effected by the protoplasmic speck dividing into two. This multiplication by division is the reproductive method which obtains in the *lowest* forms of living matter; but it is rather significant to find that the *highest* forms of non-living matter give a hint, as it were, of this very process. Certain complex fatty substances (of which Myeline, an extract from the yolk of egg, may be taken as a specimen) are capable, when placed in water, of dividing into cell-like bodies and delicate undulating tubes. Here the process cannot be caused by any vital force, and must be due to complicated internal movements between the molecules of the fatty substance.²

It is clear, then, that life in its early stages still behaves largely in conformity with the laws of non-living matter. And this surely points to the conclusion that there is no impassable gulf between the living and the non-living. No abrupt barrier cuts off animate from inanimate nature, but the stream of evolutionary progress runs from one to the other, and through each alike.

Materialists declare that, given a material vehicle of sufficient complexity, life will arise therein automatically, as one of the "properties" of the vehicle. This conclusion is as erroneous with regard to life as it has been shown to be with regard to mind. But it is nevertheless true that, until a material vehicle of requisite complexity is evolved for its reception, life cannot manifest itself in inanimate matter. This, then, is the first condition of the appearance of life. It is also necessary that the vehicle should not only be complex, but pliable, in order that the activities of life may have full play. For this purpose matter may be divided into two classes—the crystalline

¹ *Morning Post*, January 24, 1914.

² Bastian, *Nature and Origin of Living Matter*, 42.

and the colloid (or jelly-like). No hard-and-fast line, however, divides these two. It has been suggested that the colloid is composed of minute crystal particles. Many substances can exist in either form. Thus, Hæmatoidin, a constituent of the blood, and chlorophyll, the green colouring matter of plants, are each to be found in a crystalloid form; while flint is an instance of a crystal which has passed through a colloid stage. The colloid, from its pliability, is obviously better adapted to the needs of living matter, and all the plastic elements of animals and plants are in fact colloid. The crystal is a comparatively stable form, and though its structure is by no means immutable, yet it only varies within narrow limits, and life as we understand it would be hopelessly cramped within crystalline bonds. But from the greater complexity of the colloid it results that its constituent parts are less firmly knit together. Its complexity, in fact, has made it unstable, and this very instability gives it the mobility which is necessary to life. *Life, accordingly, makes its first appearance in a colloid form.* But though living matter has attained possibilities which are beyond the reach of the crystal, it does not forget its crystalline ancestry. Feather, foliage, and flower all reveal the work of the crystalline forces which living matter has brought over with it from the realm of the inanimate. The microscope makes this abundantly clear in the other forms of life also, as, for instance, in the symmetrical forms and markings of many unicellular organisms, which suggest a sort of organic crystallisation. But we need go no further than the window-pane on a frosty morning to find the story writ large and clear. There we may see with the naked eye waving plume, bending leaf, and star-petalled flower, rigid prototypes of the lush luxuriant life which the same forces have helped to fashion. Nay, even liquids retain some crystalline tendencies, since experiments have shown "that the molecules of a liquid can assume geometrical forms without ceasing to be liquid."¹

More remarkable even than these crystalline resemblances

¹ Le Bon, *The Evolution of Matter*, 99. In a lecture at the Royal Institution (March 14, 1911), Dr. Tutton exhibited some "liquid" crystals.

are the extraordinary results obtained by Dr. Stéphane Leduc from the action of Diffusion and Osmotic pressure. These are purely physical forces operating according to definite physical laws. The pressure of a gas upon any receptacle which contains it depends entirely on the degree in which its molecules are concentrated. Double the amount of gas in any given space, and, by thus doubling the number of molecules in that space, we double the pressure. Similarly, if we compress the gas into half the space, by doubling the concentration of the molecules, we double the pressure. Now, the molecules of any dissolved substance—say a lump of sugar in water—behave in every respect like the molecules of a gas. Like these, they tend to spread themselves equally over the whole volume of the liquid, and exert pressure on the boundaries which confine them—that is to say, the surfaces of the solution. This pressure is called Osmotic pressure, and it

“follows exactly the same laws as gaseous pressure. It has the same constants, and all the notions acquired by the study of gaseous pressure are applicable to Osmotic pressure. Osmotic pressure is in fact the gaseous pressure of the molecules of the solute.”¹

The process whereby the molecules of the sugar or other solute (the substance dissolved) are distributed evenly through the solution, *in opposition*, be it observed, to gravity is called Diffusion.

“This Diffusion of the solute is a phenomenon exactly analogous to the expansion of a gas. It is the expression of Osmotic pressure, or rather of the difference of the Osmotic pressure of the solute in different parts of the vessel. The molecules of the solute move from a place where the osmotic pressure is greater towards a position where the osmotic pressure is less. The water molecules, on the other hand, pass from positions where the osmotic pressure of the solute is less towards positions where it is greater. As a consequence of this double circulation the osmotic pressure tends to become equalized in all parts of the vessel.”²

Now, when liquids of different osmotic pressure are brought into contact with each other they diffuse and mingle *in definite patterns*. Accordingly, by bringing a solution of some chemical—*e.g.*, sodium chloride (common salt)—

¹ *Mechanism of Life*, 16 (translation).

² *Ib.*, 49.

into contact with a solution of some colloid, like gelatine, Leduc succeeded in building up what he calls "osmotic growths," displaying an extraordinary resemblance to organic forms.

Some of these are reproduced in Plates I. to III. Nay, more, with the help of these same forces, it has been found possible to foreshadow in inorganic matter the very mode adopted by living matter in its growth. The first step in living growth is cell-division. In the higher organisms the cell divides into two daughter cells by a somewhat elaborate process called karyokinesis. Just before division it assumes a shape known as "the mitotic figure." The illustrations on Plate IV. show how closely the inorganic approaches the organic process.¹

Nor is it in form only that these strange growths resemble living organisms; they display some equally remarkable anticipations of the ordinary vital processes. In them we find foreshadowings of cell-growth, nutrition, ejection of waste products, circulation of nutrient fluid, and senile decay.

It seems, then, that, in the evolution of inanimate matter, a steady preparation has been made for the appearance of life. Matter during this long process has learnt, as it were, to develop into forms which would be available for the vital energies which were yet to come. And life, when it does appear, plainly utilises, though it modifies to its own needs, energies which throb through inorganic matter. It is impossible to overrate the importance of these atomic and molecular energies, for they lie at the root of all structure, and the history of structure is the history of evolution. In the realm of life this is comparatively obvious. Here we see the naked cytode clothe itself with a protecting membrane and become a cell. Thereby it rises from the ranks of the Protista to those of the Protozoa or Protophyta, —i.e., the organisms, animal or vegetable respectively, which consist of a single cell only. Above these we come

¹ Professor Hartog considers that the force at work in cell-division is a dual heteropolar force, akin to statical electricity, but distinct from it, as from all known forces. He has named it Mitokinetic force (*Problems of Life and Reproduction*, 92).

to the Metazoa and Metaphyta, which are Multicellular organisms, and from these all the higher forms of life have been gradually evolved. Even Man, the highest of them all, still preserves some obstinate traces of his lowly origin. Palæontology tells us that life originated in the sea, and the researches of the physiologist confirm this conclusion. For to this day there is a close resemblance between the chemical constituents of sea-water and those of our blood. There are, no doubt, certain differences between them, but these, when examined, are only found to prove the case more completely. The proportion of sodium and calcium in sea-water and in the serum of the blood respectively are almost identical; in potassium they are not widely different, but in magnesium the two differ considerably. Now, with regard to magnesium, the sea-water of the present time contains a considerable amount of this element, but, owing to certain chemical and, particularly, thermal conditions, the heated water of the primal ocean in which life first appeared contained very little. Accordingly, it is quite natural that the blood-serum, which had its origin in this remote past, should contain very little also. There is a similar explanation for the case of potassium—to wit, that the early seas contained much more potassium than sodium and this preponderance is faithfully attested, not, indeed, in the blood, but in the living tissue of our bodies.

“Strange, is it not? that we that quarrel so ‘about it and about’—and about our lives and their origin—should bear with us in the fibers of our being the substance of our origin.”¹

But with every advance from lower to higher forms of life there has also appeared an increased complexity of structure, with a correspondingly increased range of functions. And the same rule, though here its operation may be less easy to discern, holds good also with inanimate matter. The so-called “elements” of chemistry, some eighty in number, are the simplest substances known to us, yet each molecule of these has its atomic structure. As these simple substances get linked together in combinations,

¹ Duncan, *Some Chemical Problems of To-day*, 102.

the resulting molecules get larger and their atomic structure increasingly complex. And so we rise to groupings more and more elaborate, more and more delicately balanced, more and more sensitive to surrounding conditions, more and more capable of molecular rearrangements, until a point is reached at which the entry of life becomes possible. But how and whence does life enter ?

CHAPTER VI

THE APPEARANCE OF LIFE

THE necessary prerequisite for the appearance of life is, as explained in the last chapter, the evolution of a material vehicle sufficiently complex and pliable to enable vital energy to function in it freely. And now, in seeking for the origin of life and the mode of its manifestation, let us recur for a while to the consideration of the matter into which it enters. It has been shown in Chapter IV. that matter and every material object of our experience is at root some movement or combination of movements in the ether. The lightning-flash and the hill-top which it strikes are in essence identical. But if everything owes its special existence to movements in the ether, what is that which sets the movement going? What is the stimulating influence by which all things as known to us are shaped? We have chased matter from the mass to the molecule, from the molecule to the atom, and the atom has melted into the elusive ether without betraying the secret of its origin. Like the waters of Bethesda, the ether is troubled, but the power which troubles it escapes our ken. "A force may be defined as that which acts in, or through, matter to produce motion."¹ "The power to change the state of motion of a body is energy."² But mere definitions do not carry us very far. What is the inscrutable force or energy which is here at work? To call it a "property" of the ether is but a juggle of words which explains nothing and deceives nobody. Our path is here barred by a mystery: what does it avail us to pretend that it is clear? Matter cannot be explained in terms of itself. The origin of matter

¹ Kingsland, *Scientific Idealism*, 39.

² Duncan, *The New Knowledge*, 5.

obviously cannot be placed in one of its properties. Consequently, we are driven to the conclusion that it must lie in that which is beyond matter. Here is a veil which human thought cannot penetrate; but if we may give a name to that which seems forced upon our belief, though it transcends our understanding, we may call this truly creative power Spirit. The doctrine of evolution may seem at first sight to preclude the necessity of a spiritual origin of things, but a deeper consideration will show that it makes such an origin inevitable. For, if we trace the course of evolution as far as thought or theory can carry us, we come at last to some ultimate form of matter. At this point we are instantly confronted by the question, From what has this ultimate form evolved? If it be replied that matter itself is the evolutionary fountain-head of matter, we become entangled in all the difficulties shown in Chapter II. to be fatal to the theory of materialism. Failing this, the only answer is that matter must have evolved from something non-material, that is to say, from Spirit. Under the guiding influence of this Spirit, as ether thrills into electrons, electrons cluster into atoms, and atoms become grouped into molecules, the ponderable matter of our system emerges from the mystery of its imponderable mother-substance. Now, we have seen that matter is full of motion, but there is a feature of this motion which we must not fail to notice. It is not haphazard or chaotic; on the contrary, it is, in the highest degree, orderly. And what does the presence of this orderliness reveal to us? Surely it indicates with an almost irresistible force the presence in matter of some intelligent control. Matter, in short, must be blended from the very beginning with some element of *mind*, to which it owes its character and stability. The electrons of which the various atoms are composed are themselves all alike (Chapter V.). They are just electrical charges. The difference between different substances must therefore be entirely due to differences in the arrangement and regulation of the electrons within the atoms. On this arrangement and regulation all the qualities and activities of the atom depend. In short, it is only by virtue of some mental guidance that matter is what it is.

But what is the mind with which matter is thus blended ? It cannot be identified with Spirit; for mind, in its functionings at any rate, is within the range of our comprehension, while Spirit is altogether beyond it. Moreover, the maker and the made can hardly be directly identical; there must be some medium on which the creative power can work. Matter, as we have seen, is formed out of the ether, which has the property of extension,¹ but not that of weight, and which might be described as the raw material of matter, or "matter-stuff." May not mind be wrought by the same spiritual energy out of some analogous mother-substance, *also possessing extension*, to which we may give Clifford's name of "Mind-stuff" ? In other words, mind-stuff and the mind-structures which are formed out of it must be of a *quasi material character*. They will occupy an intermediate position between Spirit and matter, and, sharing to some extent in the properties of each, will serve as a link to connect the two together. A conception of this kind will help to an understanding of how mind can act upon matter, and matter upon mind, and raises no difficulties so serious as those which it dispels. For if spiritual energy is the ultimate cause of mind and matter alike, it may well be that the interaction between the two is effected by means of the hidden affinities to which this identity of origin gives birth. The above conclusion may seem strange or repugnant to many who have been accustomed to regard mind as totally free from all material attributes, but it is a view which has been adopted from time to time,² and only by the help of it can mental phenomena be placed on an intelligible basis. Sir William Hamilton admitted that we cannot ascribe a local seat to the soul without investing

¹ A thing is said to be "extended" which occupies a definite portion of space. All material things are, therefore, extended, but mind is commonly considered not to possess extension.

² Irenæus and Tertullian both held the soul to be extended. Ulric considered the soul to be a sort of fluid, similar to the ether, and permeating the whole structure of the body. Mr. David Syme also regards the mind as extended (*The Soul*, 86); and Avicbron held the existence of an underlying matter which in itself was neither corporeal nor spiritual, but in different aspects might be either. Finally, M. Bergson seems to concede to mind some possibility of extension.

Conclusion of Mind, Spirit, Soul, concious

!!!!

- Reason

it with the attributes of extension and position; and though he was ultimately afraid of his own conclusion, he confessed that without it the union of mind and body became impossible.¹ Spencer feels a similar difficulty, and points out that we are compelled to think of a mind-substance which is affected before we can think of its affections.² In other words, attributes must be attributes of *something*: they cannot exist in a detached isolation of their own. The nature of the interaction between mind and body is simply insoluble if we must view it as an interaction between the unextended and the extended; and though by regarding the mind as extended we do not get rid of the fundamental problem, How can Spirit become or act upon non-spirit? yet we relegate it to an earlier stage of development where its difficulties are somewhat less formidable.

There is, no doubt, another explanation, which obliterates the antithesis between mind and matter by fusing the two. For the Idealism which sees in the mind and its objects merely a passing ripple on the surface of spirit, mind and matter have no independent existence at all. They appear together and disappear together also, absorbed again into the spirit which has temporarily displayed them.

"We must divest our minds altogether of the idea of mind as a thing, as properly described under the category of substance."³

"In other words, the whole, the mind as a whole, exists only in its manifestations; and, on the other hand, the manifestations have no meaning apart from the mind of which they are the manifestations. My consciousness cannot be broken up into what I am conscious of, as one thing, and the self that is conscious, as a separate thing. . . . The self is nothing apart from the activity of its mental life, and the mental life has no existence except as in a self."⁴

So, too, Kant declares in the *Critique of Pure Reason* that what in one aspect would be called material would in another be thinking being, the *signs* of whose thoughts, not the thoughts themselves, we can perceive in phenomena. But if subject and object, the perceiver and the thing perceived, are blended together in this indissoluble union,

¹ *Lectures on Metaphysics*, ii., 128.

² *Principles of Psychology*, i., 626.

³ Haldane, *Pathway to Reality*, 39.

⁴ *Ib.*, 44-6.

though the compound may be an object of knowledge to some higher intelligence, it is hard to understand how the relations of knower and known can subsist *between the two elements which form the compound*. Moreover, when we reflect that these two elements are themselves manifestations of the ultimate spirit, the tangle of relationships becomes almost too intricate for comprehension. For an aspect or manifestation involves the idea of a beholder, and in this case the only beholder is the spirit which is being manifested. The manifestation, in fact, must contemplate itself, a conclusion which, if not altogether inconceivable, is at least somewhat arid. It is surely simpler to regard mind and matter as independent manifestations of the creative spirit, between which the relations of knower and known are easily intelligible.

Moreover, if mind and matter are only fleeting variations of spirit, evolution becomes impossible for the want of anything to evolve. For evolution is a progress from the simple to the complex, a gradual unfolding of latent possibilities, and necessarily involves an existing state of imperfection or incompleteness. It is clearly inapplicable to a spiritual reality wherein all possibilities are fully expanded. We shall touch on this point again when we come to deal with the conception of the Absolute.

Meanwhile, though we must admit that mind-stuff has only a hypothetical existence, yet if the universe is formed and maintained by the energy of a spiritual power, it seems not improbable that the hypothesis is true. Now, the mode in which the atom of matter is formed is highly peculiar. It is formed by the rush through the ether of electrical corpuscles. But electricity itself consists of some motion in the ether, of ether, in fact, in a special condition. Consequently, the thing made and the instrument by which it is wrought are each composed of the same substance. In simple language, spirit may be said to form matter by driving one bit of ether through another. And, by analogy, we may conjecture that the primal mind-structure—the mental atom, as we may call it—is produced by a similar action of spirit upon mind-stuff.

It may be said, perhaps, that the hypothesis of a specific

mind-stuff is not only unprovable but superfluous, and that the ether is an adequate source for mind as well as for matter. If this is so, the ether must either be endowed with some element of mentality *ab initio*, or mind must be a product of ethereal evolution. The first supposition satisfactorily accounts for the appearance and development of mind in material bodies, but it is a postulate rather than an explanation. There is no difficulty in explaining the presence of mind in a finished material product, if one endows the raw material of matter with mentality. Moreover, this approaches perilously near to the Idealistic view that mind and matter are two aspects of a single reality. The second supposition—viz., that mind is a product of ethereal evolution—requires a closer examination. Mr. McCabe supports this view in his interesting work, *The Evolution of Mind*. He is not a mere Mechanist, and expressly disclaims “the ambition to put mechanical interpretations on the various phases of mental evolution” (p. xvii). He believes mind to be a genuine reality, evolved, like matter, out of the ether; but though mind and matter originate in the same source, their respective processes of evolution are not identical. The evolution of mind is a “second evolutionary series” which did not set in till the material world had reached a certain stage in its development (p. 7).¹ But how is mind to be evoked from a non-mental material? Mr. McCabe’s explanation is that it is formed by a more complex arrangement of factors which have been already developed, and prays in aid a chemical analogy.

“It is one of the most familiar facts of science and nature that the regrouping of elements gives rise to wholly new properties—even properties ‘differing in kind’ from those elements, Sir Oliver Lodge observes. These qualities are not made out ‘of nothing,’ but out of a combination of pre-existing qualities, which may be of a totally different order. And, surely, the formation of a central nervous system of the utmost complexity is pre-eminently one of those new combinations which we should expect to give rise to very distinctive properties.”²

¹ Mr. McCabe restricts mind within very narrow limits, hardly admitting its existence below the level of consciousness, and denying it altogether to the Protozoa (p. 30).

² McCabe, *The Evolution of Mind*, 31.

Now, to investigate the processes of matter for analogies which may throw light on the processes of mind is often helpful in the highest degree; but the analogy on which Mr. McCabe here relies is not really an analogy at all. A material redistribution of elements produces another form of matter, but, whatever the incidental effects of the change may be, it *produces* nothing else. You vary the arrangement of atoms in some material substance, and you get as a result another material substance. Here the whole process is on the material plane. But it cannot be argued from this that any amount of recombining, redistributing, or any other juggling with something which is non-mental, will produce a mental product. Here the process and the result are not *in pari materia*.

I incline, therefore, to believe in a specific mind-substance. The atom is generally supposed to consist of a vortex or strain in the ether; but however this may be, the atom and its material configuration are in some way constituted by a certain kind of push through the ether. Assuming that the mental unit is formed in the same manner—*i.e.*, by a push through something—there must obviously be some difference either in the push or in the something which is pushed to account for the difference between mind and matter. If mind and matter are each formed out of ether, then the difference must be in the push; but it is exceedingly difficult to imagine what this difference can be. If, as in the case of the material unit, the push forming a mental unit be due to an electric charge, we are forced to postulate some unknown variation of electrical force. If we assume some new form of energy to account for the push, this hypothesis is no better than the hypothesis of an unknown mind-substance. Having regard, therefore, to the pronounced distinctions between mind and matter, it seems to me preferable to refer these distinctions to a difference in the substances out of which mind and matter are respectively formed, rather than to a difference in the energy which forms them. For these reasons I think it is better to regard the mind unit and the matter unit as being formed respectively out of different substances, but by the operation of the same spiritual energy. So far as it is possible to frame

any adequate idea of mind-stuff, it must be regarded as something ethereal or quasi-ethereal in character, but much finer even than the impalpable ether of scientific inference—the ether out of which matter is made.

And, indeed, this supposition of a finer and more subtle form of ether is not without some scientific warrant. The constitution of the ether, as we have seen already (Chapter IV.), presents considerable difficulties. Among these is the difficulty of reconciling its extreme rigidity with its very slight density, a problem which strikes at the very existence of matter. Air is a form of matter of comparatively slight density, but it is capable of resisting pressure to the extent of 15 pounds per square inch. The resisting capacity of ether, however, is 15,000,000,000,000 pounds to the square inch. It has been calculated that to compress ether down to the density of air would require the pressure per square inch of a cubic mile of granite. Consequently, if matter is made up of electrons, and electrons are strains in the ether, it is not easy to see how the ether could stand the strain of the existence of matter. On this point Mr. Carr observes:

“An electron is but a vortex, and all substances are built up of electrons. One gram of hydrogen gas ($15\frac{1}{2}$ grains) means 6,800,000 horse-power stress in the ether. But mathematicians tell us that a perfectly homogeneous substance, such as we have supposed the ether to be, could not withstand such pressure as a cubic mile of granite and retain the exceeding slight density that the theory demands. They calculate, however, that a structural ether would satisfy the requirements. An ether made up of five other ethers of varying densities would, they assure us, be capable of withstanding such a pressure, and still retain the density which the theory demands, viz. about that of the atmosphere under normal conditions. So, instead of conceiving, as we have heretofore done, a universe filled with a perfectly homogeneous ether, we picture it as filled with five ethers of varying densities.”¹

Moreover, though five is the minimum which will satisfy the mathematician's requirements, there is no necessity, as Mr. Carr subsequently points out, to restrict these subtler ethers to that number. But in any case, some one of the finer ethers which the mathematical explanation supposes may well constitute mind-stuff, while the full structural

¹ *Matter and Some of its Dimensions*, 40-2.

ether serves as matter-stuff. Furthermore, bearing in mind that matter is formed by means of an electrical discharge through the ether—the *structural* ether, we may conjecture that mind is formed by a rush through one of the finer ethers of some analogue of electricity peculiar to that ether. Finally, though the two are closely associated in the later stages of evolution, we may assume that in point of time the appearance of the finer ether composing mind-stuff preceded that of the structural ether which constitutes matter-stuff.

Distinct from each other, yet each springing into existence at the bidding of the Power which is behind all things, mind-stuff and matter-stuff thus became the foundations of the visible universe. And the same spiritual energy which wove the atom out of ether, wove also out of mind-stuff a mental structure fitted to regulate its destiny. The atom has none of the adaptive capabilities of living matter, but the elaborate activity of its component parts displays an order which suggests some controlling, some directing agency—in other words, some humble form of mind. The jurisdiction of this agency is not wide, but within its tiny realm its rule is as absolute as that of the Power which beckons the worlds along. Meanwhile it may be remarked that only in some such way can we explain the order and the purpose which seem to prevail throughout Nature. Every atom may be regarded as being under some sort of mental control, and on this control Nature's order is founded.¹ The element of mentality with which each atom is thus associated constitutes the "mind-structure" of the atom; and, as atoms get built up into more complex physical structures, mind-structures of a corresponding complexity arise with them. I shall return to this question later on. Meanwhile, however, it must not be supposed that the mind-structure of the atom suffices to endow the atom or inorganic matter generally with life. The possibilities of life may be present in a material vehicle, suffi-

¹ Mr. Schiller, in his *Riddles of the Sphinx*, writes: "It is not very much more difficult to conceive of an atom as possessing rudimentary consciousness and individuality than to do this in the case of an amœba" (p. 277).

ciently complex and pliable for vital functions, but before life itself can dawn upon inanimate matter a new factor in the combination is needed. How, then, is the magic change to be wrought? Clearly by the addition of some faint element of *sentience* to the previously insensate matter, by the addition of something which enables the mass to *feel* as a whole, and, in its limited fashion, to act as a whole. The rigid obedience of inanimate matter to chemical affinities, its unswerving response to chemical stimuli, will not answer the requirements of living matter, for these chemical agencies take no heed of vital necessities, and might as easily drag the living thing to destruction as pilot it to safety. No; the keynote of life is not blind obedience, but purposeful adaptation. Herbert Spencer defined life to be "the continuous adjustment of internal relations to external relations." In less formidable language, life is perpetually striving so to adapt itself to surrounding circumstances as to insure its own continuance and well-being. Life, in fact, even in its humblest forms, has an aim.¹ In its humblest forms it is still to some extent a thrall to the chemical forces which have built up its material vehicle; but it soon rises, not, indeed, above the reach of their laws, but into a position which enables it to utilise or modify their effect.² Professor Anton Kerner points out that the chemical explanation of life is quite insufficient.

"It does not explain the purposeful sequence of different operations in the same protoplasm without any change in the external stimuli; the thorough use made of external advantages; the resistance to injurious influences; the avoidance or encompassing of insuperable obstacles; the punctuality with which all the functions are performed; the periodicity which occurs with the greatest regularity under constant conditions of environment; nor, above all,

¹ See Jennings, *Behavior of the Lower Organisms*, 23, 32, 107, 173, 178. Bacteria, Amœbæ, Infusoria, all show traces of purposefulness.

² "Whatever view we may take with regard to the question of vitalism, there can be no doubt that the most distinctive property of living protoplasm is its power of controlling chemical and physical processes so as to make them yield results different from those which would be obtained if we were dealing with not-living matter" (Dendy, *Outlines of Evolutionary Biology*, 23).

the fact that the power of discharging all the operations requisite for growth, nutrition, renovation, and multiplication, is liable to be lost."¹

Matter into which life has entered is no longer a mere complex of molecules: it is a something now animated by an organic purpose of its own. The molecule is only concerned with its molecular affinities, but the centre of interest has now been shifted from the molecule to the organism, to whose interest the molecular interests must henceforward be subordinated.

It is impossible to overrate the importance of this added sentience, but we must not misapprehend its nature. Sentience cannot in any way be wrung out of matter or out of motion *per se*. It has its origin in the mind which is associated with matter, and is a true development of it. In the limited capacity for response to stimuli which is found in even the simplest forms of inanimate matter lie the roots of that sentience which makes life possible. Sentience is the result of a higher complexity of mental structure. In the living matter with which it is linked we see that greater complexity of structure gives larger powers and possibilities. And in like manner we may conclude that mind-structures of ever-increasing complexity are gradually built up, as the material structures which they accompany grow gradually more complex. Inanimate matter is inanimate because the forms of mind incorporated with it—in other words, its associated mind-structures—are not sufficiently complex to enable them to be sentient. Directly a mind-structure capable of sentience appears it opens the door at once to physical life. Life, in fact, as before remarked (Chapter V.), is not so much the product as the reward of complexity. But though the difference between the living and the non-living is indeed a difference of kind, yet it rests on what is only a difference of degree. The mind-structure of the inanimate atom is composed of the same substance as that of the living cytode. The two differ only in the degree of complexity which they have respectively attained.

¹ *Natural History of Plants*, quoted by Mr. Robinson, *God and the World*, 81.

Substantially, physical and mental complexity will advance together, but the source of any improvement in material structure will naturally be found in the activity of the mind-structure which controls it. And behind both, be it remembered, is the Spiritual power which has called them into existence, and sustains them on their careers. To him that hath shall be given; and as the stream of development widens, the higher mind-structures which it brings forth will become vehicles fitted to receive that larger inpouring of this Spirit which appears to us as Life.

Life and mind, therefore, spring from the same source, being each a manifestation of the same spiritual energy. Somewhat on these lines Wallace, holding that there are different kinds both of life and mind, thus explains their appearance in matter:

“And as the life-giver must be supposed to cause the due amount and kind of life to flow or be drawn into each organism from the universe of life in which it lives, so the mind-giver, in like manner, enables each class or order of animals to obtain the amount of mind requisite for its place in nature, and to organise a brain such as is required for the manifestation of that limited amount of mind, and no more.”¹

This passage need not be accepted in its entirety, but it rightly emphasises the correlation of mind, life, and organic structure. The case is put more clearly and, I venture to think, more correctly by Dr. de Tunzelmann.

“Life originates by the association of pre-existing mind becoming associated with non-living matter, and thereby transforming it into living matter; that is to say, by the influx of the Universal Mind into matter, and its permanent association therewith.”²
 “Universal Mind appears as a guiding activity throughout the whole process, gradually building material organizations of ever-increasing complexity suitable for the reception of its ever-increasing influx.”³

Similarly:

“The continuous development of consciousness is satisfactorily accounted for by the theory of an ever-increasing influx of the Universal Mind into a series of organisms developing, under the influence of the Universal Mind, in such manner as to become suitable receptacles for the influx at every stage.”⁴

¹ *The World of Life*, 284.

² *God and the Universe*, 129.

³ *Ib.*, 131.

⁴ *Ib.*, 147.

It will be observed that what I have called Spirit, Dr. de Tunzelmann speaks of as Universal Mind. There is no difference between us, I think, in meaning,¹ but I prefer to describe the ultimate reality as Spirit—i.e., something unmistakeably transcendental, something which lies altogether beyond our experience—rather than as Mind, a term which almost inevitably carries with it some of the necessary limitations of the human mind.

But though life has a spiritual origin, it is no alien intruder into our scheme of things. Its marvels are not miraculous; its action is not capricious. It is rather, in Mr. Duncan's happy phrase, "a spiritual entity that abides within the body, and to a limited extent guides and directs its activities *without interfering with its energetics*."² From this point of view, therefore, mind and life may be regarded as no less inherent in the scheme to which they belong than the matter or material vehicles in which they function; none the less wonderful because they form part of its order, none the less worthy because they conform to its laws.

¹ *God and the Universe*, 181.

² *Some Chemical Problems of To-day*, 82.

Is it possible for "life" (= activity or action) to be an entity of any kind?
Can any kind of motion be an entity?
Can any form of energy be an entity?

CHAPTER VII

ARCHEBIOSIS AND HETEROGENESIS

ALTHOUGH it is not strictly germane to our inquiry, we can hardly take leave of the question of the origin of life without some notice of the theory of spontaneous generation, or Archebiosis, as it is technically called. The occurrence of Archebiosis at some period in the world's history is pretty generally accepted by scientific authorities. Weismann, Haeckel, Fischer, and Le Duc, all agree in assuming it as a necessary postulate. Indeed, for scientific thought, which will not countenance anything like a miraculous introduction of life, this theory seems a logical necessity. So far all is plain-sailing. The occurrence of Archebiosis is hardly in dispute; but when the question comes as to *how often* it has occurred, difficulties arise. Most scientists hold, with Pasteur and Tyndall, that it has occurred once only, and that all subsequent life has been derived from that which sprang into existence: *omne vivum e vivo*. Some, like Weismann and Fischer, admit that possibly it has taken place since, though they incline to think not; while Bastian, Haeckel, Nägeli, and others, insist that it is taking place daily.

Only the outline of this interesting controversy can be given here. The practical issue was whether living organisms could be made to appear in media from which all other forms of life had been excluded or extirpated. The original experiments consisted chiefly in subjecting infusions of hay and other vegetable materials to boilings sufficiently prolonged to destroy, as it was supposed, any living germs which might be present, and then hermetically sealing the infusions in a glass tube. Living organisms frequently appeared in these sealed infusions, and it was naturally

claimed that they had been spontaneously generated there. Doubts, however, were raised as to the amount of heating necessary to destroy all germs in the infusion, and also as to whether germs might not be contained in the air of the tubes. Various attempts were made to obviate these possibilities, with varying results. Neither side was convinced, and Bastian finally perceived that a trustworthy and generally acceptable conclusion could not be reached by means of these experiments. It was found impossible to agree upon a death-point of heat, for whenever organisms appeared in an infusion which had been subjected to the previously accepted death point, the opponents of spontaneous generation got out of the difficulty by arbitrarily putting the death-point higher. This gave rise to a further difficulty, for Bastian pointed out that superheating the infusion for the purpose of destroying all germs might also destroy the constitution of the fluid, and consequently its powers of germination. This possibility was corroborated by an experiment of another kind. It was found that infusions passed through a Chamberland filter would remain barren. This was claimed by the school of Pasteur as a proof that spontaneous generation did not occur when germs were effectually excluded. Bastian, however, thought it probable that the passage of the infusion through the very minute interstices of this filter might alter its constitution—"in a different way, it is true, but with the result of producing changes therein very analogous to those caused by superheating." This supposition proved to be correct. Having prepared a hay infusion, he divided it into two parts, one of which was passed through one layer of Swedish filtering paper, the other through a Chamberland filter. At the end of several days the first portion (that passed through the filtering paper) had become very turbid, showing the presence of life; the other remained perfectly clear. He then *inoculated the clear fluid* with a portion of the other, but, in spite of this deliberate inoculation, the first remained clear, and showed no signs of life. Evidently, therefore, its passage through the Chamberland filter had produced some change in it which prevented it even from supporting, much less originating, life. Shortly afterwards some other

experiments¹ showed that passing a preparation from yeast through a Chamberland filter decreased its auto-fermentation and its action on sugar. They also showed that the filter arrested the passage of certain albuminous bodies. Upon this Bastian remarks:

“Thus, removal from an organic solution of some of the larger colloid molecules by filtration seems to have an effect upon the fluid not very different from that which is produced by the probable breaking-up of such molecules during a process of superheating. The fluid in either case is notably degraded, and what I have termed its ‘germinality’ is proportionately lowered.”²

Under these circumstances Bastian seems justified in his conclusion that experiments with “degraded” fluids in small vessels are not a fair test of what may be possible in Nature under favourable instead of unfavourable conditions. Writing in 1905, however, he frankly admitted that no one had succeeded in convincing the scientific world that there was any sufficient experimental evidence to establish the occurrence of spontaneous generation at the present day.

Experiments with *organic infusions* having thus proved unsatisfactory, Bastian determined in 1906 to experiment with *inorganic solutions*, choosing, of course, inorganic materials which could sustain life if it appeared. This was clearly a more crucial test, for the germs which naturally abound in an organic infusion could hardly be present in a chemical solution. Moreover, it more closely reproduced the conditions under which Archebiosis must have first appeared, when, of course, only inorganic substances were in existence. A full account of these experiments will be found in his *Evolution of Life*, and some further experiments are given in the *British Medical Journal*, November 30, 1912, p. 1542. The solutions originally employed contained Sodium Silicate, Ammonium Phosphate, and Phosphoric Acid, to which, in some later experiments, certain other ingredients were added. The attempt was successful. The solutions were hermetically sealed, sterilised, and then exposed to light or heat for several months, and though treated with rigorous precautions, repeatedly yielded low

¹ *Proc. Royal Soc.*, No. 438.

² *Nature and Origin of Living Matter*, 157.

forms of life. They differed, however, in some important respects from the organic infusions. In the latter a large proportion of the organisms which appear exhibit very active movements, while in the organic solutions the living forms produced are invariably motionless. Moreover, the infusions generally become turbid throughout, but in the solutions the body of the liquid remains quite clear, and it is only on the bottom of the vessel that the tiny living things are found. This is quite intelligible on Bastian's hypothesis, for life might well find it harder to arise in full vigour amid the bare necessities of an inorganic solution than in the richer plenty of an organic infusion.

There were various minor points by which the success of these experiments was more or less affected. For instance, it was found that solutions which were very slightly acid were, as a rule, more productive than those which were slightly alkaline, and consequently great care was required in preparing the solutions. The results also varied to some extent with the temperature and the amount of light to which the solutions were exposed, as well as with the kind of glass of which the tubes were made. It seems, moreover, that these chemical solutions are liable, like organic infusions, to become "degraded," and suffer an alteration of constitution, by being subjected to very high temperatures. Perhaps, as Professor Quincke supposes, the solutions may take on allotropic forms when rapidly cooled from a high temperature.

Nevertheless, on the strength of these experiments as a whole Bastian claimed to have shown that low forms of life can be spontaneously generated under conditions which preclude the possibility of their having sprung from previously existing germs. Such germs are little likely to be found in freshly distilled water, or in the chemicals employed in the experiment, and it is admitted even by the Pasteur school that they would be destroyed by a temperature of 115° C. Yet in Bastian's experiments Bacilli, Bacteria, Vibriones, Cocci, Streptococci, Torulæ and other forms of Fungi, appeared in carefully isolated solutions which had been exposed for from ten to twenty minutes to temperatures ranging from 115° C. to 130° C.

"These organisms which we have seen to be living—which developed and multiplied—must, therefore, have been evolved *de novo*. What other answer is it possible to give?"¹

Moreover, since those appearing in the solutions are invariably motionless, they must have developed in the sites where they are found.

The question, however, is still undecided. It is, of course, one which only experts can decide, and scientific opinion on the whole still remains opposed to the view that the spontaneous generation of living matter is, as Bastian supposed, taking place daily in our midst. Nevertheless, he has put forward a strong case, which has been somewhat inadequately answered, and which seems to deserve a more respectful attention than it has hitherto received.

Closely connected with Archebiosis is the equally interesting theory of Heterogenesis.

"In Archebiosis we are concerned with the actual origin of living matter, while in Heterogenesis we have to do with the transformation of already existing living matter, and a consequent new birth of alien living things."²

Heterogenesis, in fact, is a process in which the actual living substance of one organism gives rise to other and different organisms. The verification of this process is complicated by the difficulty of insuring that the different forms of life which appear in this way are not due to previous infection of the substance in which they appear. Bastian tells us, however, that cases of infection by Bacteria and their allies are produced by adult organisms only, in a state of activity, while the new forms produced by Heterogenesis are invariably germs and motionless organisms. He gives, moreover, many instances in which this difficulty does not occur. Bacteria and other low forms of life, appearing first as motionless particles, and gradually assuming an adult form, were found in the interior of animal and vegetable tissues where the access of infection from outside was precluded by the application of germicidal fluids and other methods.³

¹ *Evolution of Life*, 281, 284.

² *Nature and Origin of Living Matter*, 160.

³ I have no pretensions to speak as an expert, but some of these experiments do not appear to me to be conclusive.

Still more interesting are the experiments which show the transformation of one definite form of lowly life into another, as when the resting spores of a weed called *Spirogyra quadrata* or the chlorophyll corpuscles of a plant called *Nitella flexilis* became transformed into amœbæ—a transformation of vegetable into animal life. In an article contributed to *Nature* (December 24, 1914, p. 462) Bastian recounts how he actually convinced three bacteriologists that Fungus germs, Flagellate Monads, or Amœbæ, could be produced at will from the same substance, Zooglœa. Zooglœa is a substance of a glutinous character which forms in small masses in the bacterial scum seen on ditches and stagnant water. It can also, of course, be obtained from other sources. The experiments were made with the pellicle formed on an infusion of hay. When the infusion was subjected to a temperature of 85° F., the Zooglœal masses nearly always yielded amœbæ. Under a temperature of 90° F. they yielded flagellate monads or amœbæ. Under a temperature of 98° F. no monads or amœbæ appeared, but brown fungus germs. Dr. Bastian thinks it probable that under this temperature the parent substance became "degraded," so that it could only give rise to vegetable, not animal structures.

Working on the same lines, Dr. Margaret C. Young has succeeded in developing different forms of living organisms from a single parent source. When spores of *Bacillus subtilis* were heated in a weak alkaline solution to 110° C. colonies of cocci, streptococci, and yeasts were developed. Under other treatment protozoal forms appeared. Indeed, it seems not impossible, on general grounds, that various simple organisms may have a single protozoal parent. Similarly, in 1914, Madame Victor Henri, by subjecting the bacillus of anthrax to ultra-violet rays, transformed it into a different kind of micro-organism altogether, and one apparently possessed of properties differing widely from those of the anthrax bacillus.

Whether the theories of Archebiosis and Heterogenesis be ultimately established or disproved, they suggest a variety of interesting questions. In opposition to the modern occurrence of spontaneous generation, it is urged

that the thermal and chemical conditions of the remote past, when, according to scientific orthodoxy, life came into being once and for all, were more favourable to its origination than those of to-day, and can never be repeated. This may be true; but, on the other hand, life would find to-day much richer media for its growth and development. The primal archebiosis had nothing but inorganic matter to work with, whereas in later times the abundant supply of organic matter would furnish it with far more favourable conditions.

It has also been urged, in opposition to Bastian's theories, that the forms of life which he declares appear spontaneously in his experiments are too high in order. It is said to be incredible that forms so comparatively complex should be generated *de novo* in the short periods allotted to his experiments. Professor Schäfer, in his address to the British Association (September, 1912), observes:

"If spontaneous generation is possible, we cannot expect it to take the form of living beings which show so marked a degree of differentiation, both structural and functional, as the organisms which are described as making their appearance in experimental flasks. Nor should we expect the spontaneous generation of living substance of any kind to occur in a fluid the organic constituents of which have been so altered by heat that they can retain no sort of chemical resemblance to the organic constituents of living matter. If the formation of life, of living substance, is possible at the present day, and for my part I see no reason to doubt it, a boiled infusion of organic matter, and still less of inorganic matter, is the last place in which to look for it."

Criticism of this kind may be useful when it is antecedent to experiment. But after the forms have actually appeared it is worthless and irrelevant. It is idle to dwell on the improbability of an event occurring after it has actually occurred. The only course open to the critic is to challenge the facts: to show that Bastian was mistaken as to what he professed to have actually observed; and until this is proved effectually, *prima facie* improbabilities count for nothing.

As to the *modus operandi* of spontaneous generation, Bastian seems to have supposed that the minute living organisms which appeared in his experiments were formed synthetically out of ultra-microscopical particles. But

when we ask who or what is the synthetiser, what is the power or agency which puts these lifeless particles together in a living form, we are only told "that there is a natural aptitude for the molecules of certain compounds to fall into the more complex modes of combination that exist in living matter."¹ But this assumed "natural aptitude" itself requires explanation, and if we press for an account of its origin, answer comes there none. The Mechanist is here in the same plight as the Vitalist whom he derides. No adequate physico-chemical explanation has yet been given of even the simplest vital function. The Mechanist cannot find his explanation in the facts, and, no less than the Vitalist, he is forced to place it outside them; for a "natural aptitude" is as much an assumption as a "vital force." To compare organisms with machines or engines is useful up to a certain point, but the comparison breaks down altogether if pressed too far. For, as Professor J. A. Thomson remarks:

"If organisms are engines, then they are self-stoking, self-repairing, self-regulating, self-adjusting, self-resting, self-increasing, and self-reproducing engines."²

Moreover, unlike a machine, an organism is purposive and adaptable. The machine performs its functions blindly, and it may be to its own destruction. The actions of the lowest living organism are, as has been said, purposive (Chapter VI.). In some dim way they record their experiences and utilise these memories to promote their own safety and well-being.

A good deal of stress is sometimes laid on the artificial manufacture of certain organic compounds, such as urea; but from manufacturing an organic compound to manufacturing an organism is a long step which has not yet been taken. Professor Schäfer in his address suggested that the artificial production of living matter was not so remote as was generally supposed. This is an opinion which, whether we accept it or not, must be treated with respect. But so far as our present inquiry is concerned, it leaves our con-

¹ *Nature and Origin of Living Matter*, 18.

² *Hidden Secret of Life*, *London Quart. Rev.*, January, 1913, p. 10.

ception of the entry of life untouched. As soon as any material structure appears which is complex enough to admit of a sentient mind-structure functioning within it, it at once becomes capable of life. Structural complexity is the one thing needed, and whether that complexity is attained in the realm of Nature or in the laboratory should not, in the absence of adverse conditions, make any difference to the result.

CHAPTER VIII

THE DAWN OF THE SOUL

I HAVE now attempted to sketch in outline, but in outline only, the process by which we may suppose that mind and life entered into our scheme of things, and the way is now cleared for a further advance. For in mind we have the seed from which the soul will ultimately blossom. The process of this development will, like that of life and mind, be an evolutionary process, and its story, like theirs, will be a long one. There is a formidable distance between the cytode and the man. So far we have only reached to the foot of the ladder, and we have got to find how the ascent can be made.

From the very first, as we have seen, quality depends upon structure. The properties of the atom are due to the internal disposition and movements of its electrons, the properties of the molecule to its atomic architecture, the properties of the mass to the mode in which its component molecules are arranged. These various groupings may properly be regarded as structural, for the components of each group are arranged in a definite system. Sometimes the system attains a complexity too great for the capacity of inanimate matter. Thus the radium atom is too complex to endure, and breaks up under the strain of its own atomic energies. But living matter has a wider range of possibilities. The molecule of protoplasm, which is supposed to contain about a thousand atoms, is also very unstable, but its vitality gives it a recuperative power which the other does not possess. Its instability does not bring about the permanent disintegration which slowly but surely overtakes the atom of radium; it rather becomes the instrument of living growth. Protoplasm readily

breaks down in the course of the process of life, but it is as readily rebuilt, owing to its vital power of assimilation and growth. Shifting, perhaps, from one to another of its thousand isomeric forms, it still retains its essential unity. Pliable material like this may suffice to serve the needs even of Nature's infinite variety. The ceaseless and inexorable changes of environment to which primitive living matter was exposed would have quenched its vitality had not this adaptability preserved it from extinction. Life which could not survive in one shape took refuge in another; and thus, though many perished in the process, there arose by degrees the various forms of life which people the earth to-day, and many others which disappeared.

Meanwhile we must remember that, simultaneously with this evolutionary development of physical complexity, there has grown up a corresponding complexity of the mental elements with which matter is interwoven. A mental structure has been correlated with the physical structure, which will function in the physical structure so long as the latter endures. But what happens when the physical structure is dissolved, by disintegration in the realm of the inanimate, by death in the realm of the living? Let us look into this.

We have already suggested (Chapter VI.) that mind and ether—mind-stuff and matter-stuff—appear on the scene more or less together, and blend as they descend into the grosser levels of terrestrial existence. But notwithstanding this intimate association with each other, their respective lines of development, though interlaced, are distinct. So much of the ether as becomes fashioned into matter loses its originally imponderable character, and acquires the strictly material property of *weight*. Mind, on the other hand, will be immune from the disintegration to which ponderable matter is exposed. The complexity of a mind-structure will vary according to that of the physical structure to which it is attached, and even in the earliest forms of matter the physical structure is highly complex. The simplest possible atom would be composed of a system of whirling electrons; and when we come to more advanced substances it seems probable that their respective atoms

are composed of whole groups of corpuscular systems.¹ So far, however, as the atom is concerned, a severance between its mental and physical structures would rarely, if ever, occur. So long as the atom endures, the mental structure which accompanies it will endure also. The disintegration caused by radioactivity does not really touch this point; for it is a disintegration which represents the progress of an unstable atom towards stability. An atom, like that of radium, which is unstable because it has grasped more corpuscles than it can effectively retain, settles down, as it were, into stability by shedding superfluous corpuscles. So far as its physical structure is thereby modified, its mental structure will be modified also. But, for practical purposes, the atoms which are concerned in the ordinary processes of nature may be regarded as stable. The ordinary atom, therefore, say of hydrogen, would retain its associated mental structure through all the various combinations into which it may enter. For the properties of a chemical compound are—not, indeed, the *sum total* of the properties of the various atoms which compose it, but the *resultant* of the mode in which these atoms are grouped, and of the interaction of their various properties. Water, for instance, is not in the least like either the hydrogen or the oxygen of which it is composed, but owes its special character to the manner in which the atoms of these are arranged. If water be decomposed by electricity, this arrangement is broken up, and the hydrogen and oxygen atoms go on their several ways unchanged, and retaining their respective mental structures.

There is, however, something more than this to be considered. With every atom there is associated a mind-structure which preserves the special character and properties of the atom intact. This may be called an *atomic mind-structure*. But when two or more atoms of different kinds combine chemically, as in the case of water, the situation is at once changed. The combination possesses, indeed, the properties of all the combining atoms, but it also possesses something more. For the combination is a new structure in which the properties of the combining

¹ Duncan, *The New Knowledge*, 153.

atoms have been fused into something with a character often quite different from any of them. Its molecule possesses a structural capacity in virtue of which it will acquire a *separate and independent* mind-structure (which may be called a *chemical mind-structure*), controlling and preserving the character and properties of the *combination*, as the atomic mind-structure controls and preserves those of the *atom*. What, then, happens to the mental structure of the *combination* molecule if its physical vehicle should be dissolved? The atomic mind-structures will cling to their respective atoms, but the chemical mind-structure of the *combination* molecule has nothing left to which it can cling. Obviously, then, it must either break up into its original mind-stuff, or continue its existence in, so to speak, a "discarnate" condition. The latter alternative, on the whole, seems the more probable. We have seen that, speaking generally, the material unit—the atom—preserves its structure and stability unchanged under every variety of circumstance, without disintegrating into the ether of which it is composed. The atoms of hydrogen, copper, sulphur, etc., emerge unbroken from myriads of chemical combinations. We may accordingly conjecture that, in like manner, a mental structure does not ordinarily break up, when freed from its physical vehicle, into primal mind-stuff, even when that vehicle is composed of inanimate matter. And if the mind-structure of a chemical combination can survive the dissolution of its physical vehicle, it is impossible to suppose that the mind-structure of a living being should not also survive under similar circumstances. For when we pass into the realm of living matter, and come to structures endowed with sentience, a new state of affairs arises. We have now to deal with structures which possess, not only chemical, but vital properties: properties which enable such a structure to feel *as a whole*, and accordingly make up a *vital unit*. Such a unit will require a mental equipment for itself independent of the mental equipments possessed by its chemical constituents. For the transformation from chemical to vital is a change, not merely of degree, but of kind. In a certain limited sense life may be described as the property of a special kind of matter,

but to treat it as simply one of the chemical properties of matter is to distort the facts. Indeed, so far from taking its place on equal terms among these, life perpetually interferes with, modifies, or arrests them in the interests of the organism. True, it does not attain its full authority at once, and the chemical properties, as we have seen (Chapter V.), are slow to relinquish their hold upon living matter. Nevertheless, the essential distinction between vital and chemical is clear, and it is better to regard the complexity achieved by protoplasm, not as the *cause* of life, but as the *condition* which makes possible the entrance of spiritual energy which can function as life. On this view, matter which acquires vitality passes, *ipso facto*, into a new order of being. The mental apparatus which sufficed for the chemical activities of its material molecules will not suffice for the living whole which has gathered these activities under its sway. That which was once merely an aggregate of molecules has now become an organism, which will require a mind-structure of its own for the due discharge of its organic functions. We may call this a *vital mind-structure*, as that which belongs to a chemical combination has been termed a *chemical mind-structure*. Each will survive the dissolution of their respective physical vehicles, and will thus remain available for the further purposes of Nature's scheme.

The vital mind-structure thus called into existence is the lowly origin of the human soul. For in the sentience possessed by it lies the germ from which consciousness is gradually developed. Consciousness, mere consciousness, however, is not the soul. It is, so to speak, knowledge without a knower. It recognises sensations without referring them to itself as an individual organism. But in due course, though after countless ages, consciousness, growing by degrees more elaborate, at last becomes aware of a *self* which is conscious, and with the awakening of self-consciousness come the dawn of the soul.

But the attainment of self-consciousness does not carry the soul beyond natural law. The soul, no less than the mind, so long as it inhabits a physical vehicle, is subject to the laws of its structure; and, consequently, the quality,

character, and powers exhibited by any particular soul will depend on the structure of the brain with which it is associated. For the soul is only a mind-structure, albeit of a high order, and, like all mind-structures, when incarnate, it can only express itself by means of its physical vehicle, and within the limits imposed by the structure of that vehicle—*i.e.*, the brain. This is forcibly illustrated by many cases of cerebral injury. A blow on the head may reduce a sane man of high character and capacity to a gibbering idiot; but in such a case, unless we make the incredible supposition that the impalpable mind-structure can be affected by a physical blow, it is obvious that, not mind, but its instrument only is injured. Sometimes the physical injury can be repaired, and then the mind-structure, which has remained intact throughout, can operate as fully as before. Destroying the brain does not mean annihilating the mind, any more than (to borrow from Sir Oliver Lodge) smashing an organ is equivalent to killing the organist.¹

Moreover, in this distinction between the mind-structure and its vehicle we find an answer to the difficulty, referred to in Chapter I., of mental heredity. Unless, like M. Fournier, we adopt some theory of mental or spiritual germ-plasm, mental heredity is inconceivable, at any rate in the higher orders of life. Some process somewhat analogous to it may take place among unicellular organisms, but it is impossible in organisms where the germ-cells are segregated from the body-cells. Hereditary transmission, therefore, can only take place on the physical plane, but this may prove to be sufficient for our purpose. The mental qualities of the parent are conditioned by the structure of his own brain; and though he cannot transmit the qualities themselves, he *can* transmit a brain of similar structure—a brain so physically constructed as to permit, or even require, the manifestation of these qualities in his progeny. Once more let me repeat that quality depends upon structure. Consequently, a mental quality—say, musical aptitude—depends upon some peculiarity of structure in the particular human soul. But a soul so constructed can only function effectively in a suitable brain—*i.e.*, a brain con-

¹ *Man and the Universe*, 93.

taining some peculiarity of physical structure corresponding to the peculiarity of mental structure on which the musical aptitude depends. If a parent having this aptitude should transmit the suitable brain,—or, more strictly, the factors for its formation,—and the child's brain gets built up, a mind-structure adapted to it gets built up simultaneously. In the end a new soul is formed which *seems* to display the parental quality, but in truth it is only a *similar*, not the same quality which appears. It has not been drawn, like the child's body, from parental sources. It springs from the child's own soul, and this the child has not derived from parental sources, but only a brain suited to it.

The soul, indeed, has an existence which is independent of the perishable body, but so long as it is associated with this body its functioning is conditioned by the structure of the bodily brain. Mr. Constable, who regards the human personality as a partial and mediate manifestation in time and space of an intuitive or spiritual self behind it, yet holds that this higher self is subject to the conditions of its fleshly vehicle, and that distinctions in mentality are due to distinctions in the structure of the brain.¹ Similarly, Myers speaks of "a brain whose very conformation must keep the spirit that thinks through it nearly on the level of the brute," though this spirit may remain comparatively uninjured by the degradation of the body.² For vicious bodily habits may often be cured by hypnotic suggestion, which by modifying the nervous centres causes the habit to disappear. In such a case it is clear that the source of the mischief is the body rather than the soul, which is something distinct from the body in which it functions, and is only forced, as it were, into evil courses by the peculiarities or imperfections of the latter. The body and the soul, in fact, are temporary partners, not a permanent combination, and while the fate of one is to perish, the destiny of the other is to endure.

To return to the dawn of the soul, it seems reasonably clear that this cannot precede the appearance of self-consciousness, but the actual process by which self-con-

¹ *Personality and Telepathy*, 66, 107, 110.

² *Human Personality*, Abridged Edition, 136, 155.

sciousness is attained remains very obscure. As to how *self*-consciousness is evolved out of mere consciousness, how from a simple capacity for apprehending sensations there should arise an awareness of a self which apprehends, it is very difficult to determine. Whether we regard self-consciousness as a definite endowment miraculously conferred, or as an "appanage"¹ of actions in some of our higher nerve-centres, or as evolved from a purely mental origin by the co-ordination of lower psychic states, the explanation in each case is far from satisfactory. None of these theories give us any real insight into the nature of self-consciousness. The first need not detain us, as it is outside the scope of our inquiry. The second indicates to some extent the physiological conditions which attend the appearance of self-consciousness, but leaves its actual character unexplained. Dr. Bastian (*loc. cit.*) describes consciousness as a result of something which moves. He adds, however:

"To show how these particular motions in nerve-tissue arise which underlie Conscious States must, from the very nature of the problem, ever remain impossible. But we certainly should not on this account allow ourselves to be mentally paralysed by a belief in the existence of a metaphysical gulf between what is termed the Subjective and the Objective—the 'Ego' and the 'Non-Ego.'"

So, too, Haeckel denies that the self has any existence independent of the body, and declares psychic activities to be nothing but "a group of vital phenomena, which are dependent on a definite material substratum, like all other phenomena."² He considers the higher psychic activity of man and the higher animals to have been evolved on these material lines by a process which is merely "a higher degree of integration or centralization of association or combination of functions which were formerly isolated."³ Nevertheless, he admits that "however certain we are of the fact of this natural evolution, we are, unfortunately, not yet in a position to enter more deeply into the question and construct special hypotheses in elucidation of it."⁴

¹ Bastian, *The Brain*, 689.

² *The Riddle of the Universe*, 92.

³ *Ib.*, 93.

⁴ *Ib.*, 191.

The third theory, while giving the self-consciousness a definite mental origin, is also rather vague as to the mode of its genesis. Spencer regarded mind and matter as two faces of one unknowable reality. The two are different, but they display the same order of development. Mind, he thinks, is developed from an ultimate (and inscrutable) "unit of consciousness," out of which, by means of various combinations and compoundings, are gradually produced sensations, perceptions, ideas, "and so on up to the highest thoughts and emotions."¹ This, of course, includes self-consciousness, but the exact mode of its production is not very clear. Romanes,² in an acute and careful study of the question, traces mental growth from Simple Ideas or Percepts, which are mere memories of particular sensuous perceptions, to compound ideas or Recepts, classified into a humble form of composite idea—such a form, in fact, as alone is possible before the appearance of language, and which is found in infants and the lower animals. The higher composite ideas which only become possible with language he calls Concepts; and these are arrived at by "the process of naming abstractions as abstractions." They involve definite Reflection, Comparison, and Classification, and are only to be found in the adult Self-conscious Man. According to him, however, the rudiments of self-consciousness appear in the lower animals, many of whom have attained what he calls an "outward" or Receptual Self-consciousness, which gives the creature "a practical recognition of Self as an active and feeling agent." Even a child, for instance, usually speaks of itself in the third person. It does not think of itself as in definite contradistinction to all other objects and persons, but regards itself as one among many objects.³ This Receptual Self-consciousness, however, is in all cases objective only, unlike the fuller inward or Conceptual Self-consciousness of the adult, which is the introspective recognition of self as an object of knowledge.⁴ But here, again, the steps of the process are indicated rather than explained; and in the

¹ *Principles of Psychology*, i., 624-7.

² *Mental Evolution in Man*.

³ *Ib.*, 201.

⁴ *Ib.*, 199.

following significant passage he recognises that there may be something more at work than automatic combinations and co-ordinations of lower mental states to account for the appearance of self-consciousness.

"Nevertheless, there is some reason to think that when this growth has attained a certain point, it makes, so to speak, a sudden leap of progress, which may be taken to bear the same relation to the development of the mind as the act of birth does to that of the body. In neither case is the development anything like completed. Midway between the slowly evolving phases *in utero* and the slowly evolving phases of aftergrowth there is in the case of the human body a great and sudden change at the moment when it first becomes separated from that of the parent. And so, there is some reason to believe, it is in the case of the human mind. Midway between the gradual evolution of receptual ideation and the no less gradual evolution of conceptual, there appears to be a critical moment when the soul first becomes detached from the nutrient body of its parent perceptions, and wakes up in the new world of a consciously individual existence."¹

If, however, self-consciousness be an attribute of a structure which is extended, and therefore quasi-material, some material explanation of its *modus operandi* may be attempted. I will accordingly venture to repeat a suggestion which I have made elsewhere.

"If we still press for a mechanical account of how self-consciousness operates, we may arrive at some such conclusion as this. Consciousness is a mental structure which responds more or less perfectly to nerve stimuli. If this response be described in terms of matter, we must regard it as being in itself a sort of thrill. Accordingly, in the mind-structure of an animal incapable of *self-consciousness*, a conscious state is just a responsive thrill, the recoil to which would pass off in some of the commoner forms of energy. But in the more sensitive and complete mind-structure of the man, the recoil might partly pass back into the mind-structure, and this absorbed recoil constitute consciousness of *Self*. In this case a state of simple consciousness might be described as the mind-structure's thrill to nervous stimuli, a state of self-consciousness as a thrill to its own thrills."²

We have seen that motion of some sort is at the root of all existence known to us. The human organism itself has been described by Myers as "a practically infinite

¹ *Mental Evolution in Man*, 208.

² *Some Problems of Existence*, 14.

complex of interacting vibrations'';¹ and if this description be accepted, there seems no reason why vibration should not suffice to account for even the highest human attribute.

And here we may pause for a moment, and look back at our leisure upon the road over which we have travelled. Regarding the soul as that which is permanent in the mental equipment of man, we have attempted to trace its origin and discover its nature. Has it a past? Has it a future? Does it come into existence out of nothing at the physical birth of man, or has it risen laboriously in the course of long ages out of lower forms? Again, if it be something evolved out of the past, is it subsequently transmitted to the future? and if so, how? Theology gives us no decisive opinion on these knotty points, and, indeed, every view is full of difficulties. But amid all this perplexity one fact at least is plain. The soul is something which is alive; and accordingly it seemed possible that if we could form any conclusions as to the nature and origin of life, they might help us to guess at the nature and origin of the soul. Upon any evolutionary theory life must at some point have arisen in inanimate matter. Matter which was not previously living must at some point have become alive. Even from our cursory investigation of the borderland between the two realms, we found that the division between the living and the non-living is much less sharply marked than is sometimes supposed, and, indeed, that there is a certain continuity between the two. On the one hand, the highest forms of inanimate matter give hints, as it were, of the properties peculiar to life; and on the other, the processes of life often show the influence of the laws of that inanimate matter in which it arose. Every advance, however, means ultimately a structural advance; each step higher in the scale of existence implies an increased complexity of structure in the thing making the step. And though this increased complexity can hardly be regarded as the *cause* of life, it is certainly an indispensable condition of its appearance. Whence, then, does life make its entry into matter, and what is it? Now, the most conspicuous feature of life is its constant movement, which seems to distinguish

¹ *Human Personality*, Abridged Edition, 259.

it sharply from the *apparent* inertness of inanimate matter. If life is to be deemed to originate inside nature, what natural source can be found for its movement? As we have seen, this movement may be supplied by matter itself, whose inertness is apparent only, and which literally seethes with motion of every kind. Nevertheless, mere motion, however complex, is not equivalent to vitality. Something more is required to turn even the most mobile matter into living matter, and that something is an element of sentience. Faint though this may be, it enables the living mass to feel as *a whole*, and, in a limited fashion, to act purposefully as a whole. This sentience, of course, is *mental* in character, and in seeking for its origin we have found reason to think that mind in some humble form is associated with matter from the very beginning. Even the atom possesses a mental element of its own, to whose control it owes its character and stability. It has been shown that the primal substance of ponderable matter is ether, out of which matter is formed by the motion of some external power; and it has been suggested that mind may also be formed in a similar manner out of another and distinct substance, to which the name of mind-stuff may appropriately be given. The existence of this external power is, it must be admitted, hypothetical only, yet it is a hypothesis from which we can hardly escape; and though we cannot form any complete conception of what the nature of the power may be, we have called it Spirit. How mind-stuff and matter-stuff (ether) arise under its fashioning touch is, no doubt, a most difficult question; but their emergence, no less than their subsequent evolutionary development, appears to be part of a scheme, moving along definite lines, which, if not actually inviolable, is, so far as we can see, inviolate. Matter and mind, then, develop together under the impulse of the spiritual energy which is behind them both, until a structure is reached which, physically and mentally, is fitted for the admission of life. And in the sentient structure which is the first vehicle of life we have the beginning from which, in due course, the self-conscious mind-structure—the soul—of man is developed.

And thus, at last, the human soul, struggling up through ages of prehuman conditions, emerges into the light of day, and casts wondering eyes on the mysteries which confront it. The darkness of the past is behind it, the darkness of the future before; but even the present is full of bewildering perplexities, and with some of these we shall now attempt to deal.

CHAPTER IX

AN EVOLUTIONAL DIFFICULTY

WE have throughout ascribed an evolutionary origin to the soul. We have claimed that the self-consciousness in which the soul appears is an orderly development from lower forms of consciousness. But if we rely on the Evolution theory for support, we must also conform to its conditions, and we are here confronted by what is at any rate an apparent violation of these. Development, as distinct from mere variation, must, on evolutionary principles, represent a continuous chain. Any serious gap in such a chain would go far to disparage the evolutionary character of the development. Consequently, if self-consciousness is evolved from consciousness, the process ought to show a steady continuity. In dealing with mind and matter we have so far treated them as advancing substantially together. No mental advance takes place till an advance in bodily complexity makes it possible; while, on the other hand, any increase in bodily complexity is originally due to mental stimulation. The mind-structure of the bodily vehicle supplies the impetus towards the further complexity of that vehicle which alone can insure its own advance.

Now, the *physical* evolution from lower to higher forms of life displays on the whole a remarkable continuity. There are gaps, no doubt, which have not as yet been fully explained, but they do not seriously affect the main thread of the story. When we turn, however, to study the course of the *mental* evolution with which this physical evolution is associated, we find ourselves on much less certain ground. Speaking generally, mental development has advanced *pari passu* with the growth of physical, and more especially cerebral, complexity. Primitive sentience gradually gives

place to consciousness of a low order, which, in its turn, evolves into superior forms, till in the higher animals a comparatively advanced level of reason has been attained. So far the evolution of consciousness shows a general continuity. But before we reach man, who alone is credited with self-consciousness or soul, this continuity appears to be sharply broken. There is a gap between the mental capacity of man and that of his nearest evolutionary kin, the highest anthropoid apes (orang, chimpanzee, gorilla), and, unless this gap can be explained or bridged over, it forms rather a serious objection to the view that soul is a product of evolution. We cannot examine a consciousness under the microscope, or study it in the laboratory and our only course, therefore, in the present difficulty is to turn to *the organ in which consciousness functions*—the brain. At first this does not seem to help us much, because, so far as brain *conformation* goes, there is very little to choose between man and the higher anthropoids. Indeed, in this respect the latter are nearer to man than to some of the lower anthropoids.

"The brain of man" (writes Bastian) "belongs to the same type or pattern as that met with among apes and monkeys. Whatever interpretation may be put upon it, this fact itself is too obvious to admit of any doubt. The same general shape is to be seen, the same lobes, the same principal fissures."¹

So, too, Broca says:

"Je viens de passer en revue tous les caractères anatomiques ou morphologiques à l'aide desquels on a cherché à séparer le type du cerveau humain de celui du cerveau des autres primates; vous avez pu voir que ces caractères différentiels sont tantôt tout à fait illusoires et tantôt tellement faibles qu'ils ne laissent entre l'homme et les anthropoïdes qu'un intervalle très-étroit, tandis qu'ils établissent au contraire une distance considérable et parfois excessive entre les anthropoïdes supérieurs et la plupart des genres de pithéciens ou de cébiens."²

There are important differences, no doubt, in general development between the human and the anthropoid brain, notably in the greater size and complexity of the frontal lobes in man, and in the superior richness and complication of the secondary fissures and convolutions; and it is on

¹ *The Brain*, 376.

² *Mémoires d'Anthropologie*, 139.

these that man's mental superiority really depends. Yet even in these respects the chimpanzee and orang resemble man so closely that it requires the practised eye of an anatomist to distinguish their brains from the human brain in drawings on the same scale.¹

But notwithstanding this close similarity of brain conformation, there is one very decided distinction between man and the anthropoids—namely, the difference in the size and weight of their respective brains. As to size, the orang and chimpanzee have cranial capacities of 26 and 27½ cubic inches respectively, while, for normal man, the lowest cranial capacity is 55 cubic inches.² As to the weight, the gorilla's brain weighs 20 ounces, according to Broca, and those of the other anthropoids range from 12 to 16 ounces.³ But the average weight of the civilised male brain is 49 ounces, of the female 44 ounces, while a weight of from 32 to 37 ounces is the minimum compatible with ordinary human intelligence, though idiot brains may sink as low as 10 ounces. The gaps here shown between man and the nearest animal are obviously considerable.

Now, though mere size and weight are not, as we have seen (Chapter III.) very satisfactory criteria of mental capacity, it seems clear that they have some relation to mental characters. They affect the quality of the mind of which the brain is the organ. "The lighter and smaller the organ—that is, smaller relatively to the whole organism—the weaker, *ceteris paribus*, will be its functional power."⁴ More than this, it seems possible that cranial capacity may be *mechanically* increased by mental activity. The growth and development of brain-tissue ordinarily continues until checked by closing of the sutures of the cranium. This closing seems to take place in the higher races at a later period of life than in the lower; and with idiots it occurs

¹ *Mémoires d'Anthropologie*, 130.

² Keane, *Ethnology*, 25.

³ Bastian, *The Brain*, 376.

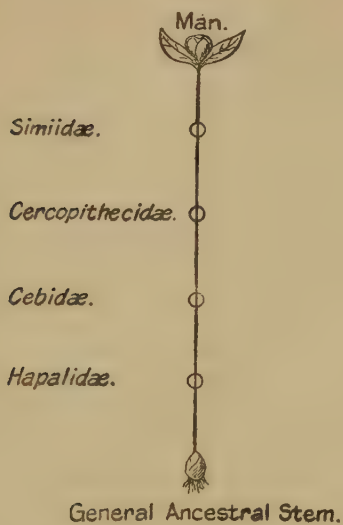
⁴ Keane, *Ethnology*, 191. This factor must not be overlooked, for it accentuates the cerebral difference between man and the anthropoids. Thus, if the lowest brain-weight compatible with human intelligence be 32 ounces, not only is it 12 ounces above the gorilla's brain-weight, but it is associated with a body which is only about half the weight of the gorilla's body.

very early. In the Neanderthal skull (*infra*, p. 101) the frontal sutures—those relating chiefly to the area of intelligence—are closed, while those of the occiput—which relate rather to the animal development associated with the cerebellum—are more or less free.¹ Moreover, in the lower types generally, the top of the cranium tends to be flat. This is only what might be expected, and it appears to indicate that the brain-cap may be mechanically enlarged by the pulsation of brain which accompanies mental activity, and that there is thus some direct connection between mental and cerebral expansion. So, too, with regard to brain-weight, the available data do undoubtedly seem to show that there is a minimum brain-weight essential for the presence of human intelligence.

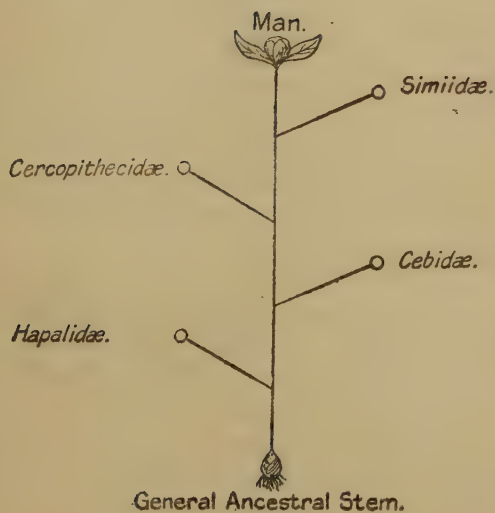
Here, then, we are confronted by a cerebral gap between the lowest man and the highest anthropoid which we are unable to bridge with any materials to be found in the present. We must therefore interrogate the past; but before doing so it may be well to deal shortly with a popular fallacy, which, though repeatedly contradicted, still survives. In the early days of evolution the misconception on which this fallacy is based was more intelligible. Though the general idea of evolution was more or less adequately grasped, its methods were not very clear to the public, and, indeed, had not been fully worked out by men of science. By the public it was vaguely supposed that the highest organism was a lineal descendant from the lowest, while the possibilities of adaptation were wildly exaggerated. Hence the clumsy raiillery about the bear who took to swimming and became a whale. Nowadays the theory is better understood; but even now, in speaking of the evolution of man, it is frequently assumed that the doctrine of evolution supposes him to be *directly* descended from some of the existing anthropoid apes. This, however, is not the case. The doctrine regards man as coming from the same ancestral stock as the anthropoids, but does not suppose any of them to have been his direct ancestors.

¹ The skull of the infant and the negro are also more developed in the occipital than in the frontal part (Wilson, *Education, Personality, and Crime*, 130).

His line of evolution is not



but



We can only guess, of course, at the date when truly human evolution began, or the length of time which its different stages occupied. The age of the Earth has been variously computed. The lowest estimate is 20,000,000 years, which seems, however, to be manifestly too small, in the light of later knowledge. The highest estimate places it at 370,000,000 years, and this we may adopt provisionally. For our present purpose, however, we need only take up its story at the point where true mammals begin to appear—*i.e.*, at the Eocene Age. This may be placed conjecturally at about 3,200,000 years ago, and lasted 1,200,000 years. Then followed the Oligocene, lasting another 1,200,000 years. This gave way to the Miocene, which lasted about 900,000 years, to be succeeded by the Pliocene, which lasted some 500,000, and was followed by the Pleistocene, which occupied about 400,000 years.

Prior to the appearance of the anthropoid apes all forms belonging to the group of primates were pronograde in posture and movement. The Gibbon now represents these primitive apes, whose date should probably be placed about the end of the Eocene. But as erect or semi-erect posture gradually appeared, a distinctively human development became possible, and at this point the human branch definitely emerged. Man is, in fact, the topmost shoot of the ancestral stem, of which the existing anthropoid apes are independent branches. Consequently, we shall search among *these* anthropoid apes in vain for any intermediate forms which will help to fill the cerebral gap between them and man. No gorilla or orang-utan, for instance, could ever become cerebrally human. Such forms, if they are to be found at all, must be sought on the main stem, between the point where the Simiidæ branched off it and that which modern man has reached. Of course, in this search, which can deal only with the fossil remains of earlier types, evidence of brain-weight or cerebral intricacy is out of the question. "Mind leaves no fossil impressions in the soil." We are restricted, therefore, to the testimony of cranial capacity and construction alone. It is not so satisfactory a criterion as weight, but, as has been shown, it possesses some value

as an indicator of mental quality. Though it is a physical factor in the problem, it serves as a connecting link between the criteria applied respectively to the mind and to the brain in which the mind functions.¹ Moreover, brain-size must in general bear some relation to brain-weight. *Prima facie*, therefore, we should expect to find, as we get farther and farther back into the history of the Hominidæ, a gradual decrease in cranial capacity. Curiously enough, however, this is not altogether the case. The fossil evidence is somewhat meagre, but it places beyond all doubt the fact that the cranial capacity of prehistoric man was often surprisingly high. The cranial capacity of the average European is reckoned at about 1,480 cubic centimetres. Yet in the far lower human types presented by the Neanderthal man, who probably lived not less than 500,000 years ago, we find cranial capacities ranging from about 1,300 c.c. in the Heidelberg man²—the earliest man of Neanderthal type—to 1,500 to 1,600 c.c. in the Spy men, who were later specimens of the same type. Commenting on this fact, Dr. Keith remarks:

“We of a later generation, with a fertility of mechanical invention, can little understand the great brain which was necessary to make the first steps towards human civilisation. The first stages of any new endeavour are notoriously the most difficult.”³

In like manner Romanes, commenting on Wallace's statement that the brain of savage man is quantitatively and qualitatively in advance of his requirements, points out (with Darwin)

“that the power of forming abstract ideas with the complex machinery of language as the vehicle of their expression is probably of itself enough to account for both the mass and the structure of a savage's brain.”⁴

I may further suggest that a certain minimum cerebral mass is perhaps necessary for the effectuation of that absorbed recoil which possibly constitutes self-consciousness (see Chapter VIII.).

¹ Keane, *Ethnology*, 191.

² Discovered in 1907 in the sandpit of Mauer, near Heidelberg.

³ *Ancient Types of Man*, 112.

⁴ *Darwin and After Darwin*, II., 26.

However, when we get past the Neanderthal man, signs of a diminishing cranial capacity begin to appear. The Gibraltar fossil skull, which is sometimes described as pre-Neanderthal, is rather gorilloid in conformation, and has a cranial capacity of about 1,080 c.c.¹ It is 200 or 300 c.c. lower than the average Neanderthal man, though not greatly inferior to some of the lowest living races. It is certainly a step, though not a very great step, nearer to the anthropoids.

But towards the end of the last century a discovery was made of a still earlier type, which does appreciably diminish the gap. In 1891-2, Professor Dubois discovered at Trinil in Java some fossil remains of an extinct animal, to which he gave the name of *Pithecanthropus erectus*, and which he regarded as a link between man and the anthropoids. He reckoned its cranial capacity at 855 c.c., and placed its date in the Pliocene period. It is now generally considered that the remains are those of an animal which was human, or at least subhuman, about 5 feet 6 inches high, adapted for erect posture, and, to some extent at any rate, capable of speech.² The skull represents a stage in the evolution of the human head considerably below the earliest stages yet found in Europe, and is of a pre-Neanderthal type.³ Manœuvrier describes it as having a cranial capacity of from 900 to 1,000 c.c., and remarks that it stands at the level of the smallest which have been occasionally found amongst the reputedly lowest savage people;⁴ while Duckworth estimates its brain-weight as about half that of the average European—say, 20 to 25 ounces.⁵

Without going at length into the various questions raised by this most interesting relic, *Pithecanthropus erectus* appears to have been a true precursor, and possibly a direct ancestor, of modern man. He also seems, especially in the matter of cranial capacity, to be intermediate between the anthropoids and the Gibraltar man, as the latter is intermediate between *Pithecanthropus* and the Neanderthal man.

¹ Keith, *Ancient Types of Man*, 136.

² Keane, *Ethnology*, 426.

³ Keith, *Ancient Types of Man*, 138-9.

⁴ Keane, *Man, Past and Present*, 4.

⁵ *Prehistoric Man*, 3.

The remains of *Pithecanthropus* actually found consisted of the upper part of a skull, part of a lower jaw, three teeth, and a left thigh-bone. These remains, apart from the special question of cranial capacity, furnish evidence of the general intermediate character of *Pithecanthropus*. Dr. Duckworth writes:

"The arguments founded upon the joint consideration of the length of the thigh-bone and the capacity of the skull are of the highest interest. For the former dimension provides a means of estimating approximately the body-weight, while the capacity gives an indication of the brain-weight. The body-weight is asserted to have been about 70 Kgm (eleven stone) and the brain-weight about 750 gm. And the ratio of the two weights is approximately $\frac{1}{94}$. The corresponding ratios for a large anthropoid ape (orang-utan) and for man are given in the table following, thus:

Orang-utan	-	-	-	$\frac{1}{183}$
Pithecanthropus erectus	-	-	-	$\frac{1}{94}$
Man	-	-	-	$\frac{1}{51}$

The intermediate position of the Javanese fossil is clearly revealed."¹

Quite recently another important relic of early man has been discovered by Mr. Charles Dawson near Piltdown Common, in Sussex, to which the name of *Eoanthropus Dawsoni* has been given. By the courtesy of Mr. Dawson² I am permitted to publish the accompanying photograph of the skull of *Eoanthropus Dawsoni* (restored). The remains consist of an imperfect skull and a mandible. As appears from the Monograph on the subject by Mr. Dawson and Dr. Smith Woodward, there is some doubt as to their exact age. The skull is essentially human, "only approaching a lower grade in certain characters of the brain, in the attachment of the neck, and in the probably large size of the face." The mandible, however, which was found separately, appears to be precisely that of an ape, with nothing human except the molar teeth. In fact, it closely resembles that of a young chimpanzee. It is possible, of course, that the mandible does not belong to the skull, but this view does not seem to be generally entertained.

¹ *Prehistoric Man*, 3.

² The regretted death of Mr. Dawson took place since this was written.

The cranial capacity was originally given as 1,070 c.c., but Mr. Dawson subsequently informed me that this estimate must be somewhat increased.¹ The skull appears to be admittedly the oldest human skull hitherto found, and the question is to what period it belongs. The gravel-pit where it was discovered is Pleistocene, but the remains were found in close association with mammalian relics of the Pliocene period. These were regarded by the discoverer and others as having been washed down from some Pliocene deposit. Professor Keith, however, confidently pronounced the skull to be Pliocene; and Mr. Newton took the same view, basing his belief on the highly mineralised condition of the specimens. In some respects it is more, and in others less apelike than the Neanderthal skull; and in this Professor Keith finds a corroboration of the opinion held by some anthropologists, that in the early stages of human evolution there were, not one, but many different species and genera of mankind. Mr. Dawson and his coadjutor consider that at the end of the Pliocene Age the representatives of man in Europe were already differentiated into widely divergent groups, and that *Eoanthropus* is a newly discovered genus of the family *Hominidæ*. It is thought probable that *Eoanthropus* could speak.

The following table may serve to give an idea of the respective cranial capacities of early man and the anthropoid apes:

Neanderthal man	about 1,300 to 1,500 c.c.
Gibraltar man	„ 1,080 c.c.
<i>Eoanthropus</i>	„ 1,070 c.c. (or more)
<i>Pithecanthropus</i>	„ 855 to 1,000 c.c.
Gorilla and Orang	„ 500 to 600 c.c.

Corresponding with this gradation of brain there must have been similarly graduated intelligences adapted to function in them respectively. Such intelligences may serve in some degree to fill the mental gap which now severs man from the anthropoids, and they certainly do point to some process of evolution.

It must be admitted, however, that the graduation shown

¹ Professor Keith estimates it at 1,397 c.c. (*Antiquity of Man*, 390), but other authorities still put it at about 1,070 c.c. (Scott Elliot, *Prehistoric Man*, 128).

by the above table, though it suggests the possibility of a sufficient number of intermediate mind-structures to fill the gap, does not altogether suffice to prove their existence. Cerebral capacities of a modern type evidently go back quite as far as Neanderthal man, and if Professor Keith's estimate is correct, as far back as *Eoanthropus*. This shows that the intermediate forms of brain must be sought in a yet more remote past. Sir E. Ray Lankester considers it not improbable that as far back as the Lower Miocene

"natural selection began to favour that increase in the size of the brain of a large and not very powerful semi-erect ape which eventuated, after some hundreds of thousands of years, in the breeding out of a being with a relatively enormous brain-case, a skilful hand, and an inveterate tendency to throw stones, flourish sticks, protect himself in caves, and in general to defeat aggression and satisfy his natural appetites by the use of his wits rather than by strength alone—in which, however, he was not deficient. Probably this creature had nearly the full size of brain and every other physical character of modern man, although he had not as yet stumbled upon the art of making fire by friction, nor converted his conventional grunts and groans, his screams, laughter and interjections into a language corresponding to (and thenceforth developing) his power of thought."¹

If we ask why so few traces of these precursors of man remain, the following answer is given by Wallace:

"All Evolutionists are satisfied that the common ancestor of man and the anthropoid apes *must* date back to the Miocene, if not to the Eocene period; so that the real mystery is, not that the works or remains of ancestral man *are* found throughout the Pleistocene period, but that they are *not* also found throughout the Pliocene, and also in some Miocene deposit. There is not, as often assumed, one 'missing link' to be discovered, but at least a score of such links adequately to fill the gap between man and apes; and their non-discovery is now one of the strongest proofs of the imperfection of the geological record."²

This is, at least, a possible explanation. It may not be evolution, but its geological record which is at fault: in which case further research might conceivably complete the record and demonstrate the due evolution of man, mentally and physically.

But here a new problem confronts us. Evolution supposes a gradual advance from lower to higher forms. The

¹ *The Kingdom of Man*, 15.

² *The World of Life*, 247.

present is the product of the past, and evolution is an advance from earlier to later. We should naturally expect this progression, so far as it can be traced in any particular stock, to be in a single direct line, with the low forms at the bottom and the high forms at the top. We should also expect, in conformity with experience, that the lower forms of the particular stock would disappear as the higher forms became established. Consequently, it would be disconcerting to find in any such case low forms either contemporaneous with the higher forms, or so nearly contemporaneous that they could not have been the ancestors of the higher forms. Now, this very difficulty occurs in the case of man. Without attempting to go fully into this still obscure problem, a single instance will suffice to illustrate it. We have seen that, in cranial capacity, Neanderthal man (*Homo Neanderthalensis*) was on a level with modern man (*Homo sapiens*); but in general structure, with certain exceptions, he was much nearer the apes. It is certain, nevertheless, that he was contemporaneous, or nearly so, with man of a modern type.

"Beyond any doubt we have traced men of the modern type—men belonging to races as highly evolved in body and brain as any race now living—to the beginning of the Aurignacian period. The men of Combe Capelle and of the Grimaldi caves were as highly evolved as any modern people, and yet they may have seen—probably did see—the Neanderthal men, with their simian brow-ridges."¹

Much the same may probably be said of *Eoanthropus*, which is considered to be most ancient of all human remains so far found in England, and which evidently coexisted with men who had reached the level of *Homo sapiens*. Nor is this all; for it appears from such evidence as is available that the higher type may be as old as the lower one. Indeed, we have an instance of the coexistence of high and low types before our eyes to-day—in the native Australian and the European. The late Sir William Turner found by measurement of the skulls of twenty-four native Australian women that the average cranial capacity was 1,116 c.c., one being as low as 930 c.c.²

¹ Keith, *Antiquity of Man*, 249-50. The date may be put conjecturally at 200,000 years ago.

² *Ib.*, 270.

What is the inference to be drawn from these facts? So long as we could suppose that human evolution proceeded by regular stages and in a direct line from the lower types known to us by their fossil remains to the civilised man of the present day, the story, in outline, was comparatively simple. There were gaps in the series as known to us, but these did not compel us to discredit the existence of the series. A ladder which has lost some of its rungs is still a ladder. But when in one of the earliest of the known stages we find a high type coexisting with the low type peculiar to this stage, it seems impossible to regard the latter as ancestrally related to the former. Accordingly, if these earlier forms are not direct ancestors of modern man, it is evident that mankind in its entirety cannot have sprung from a *single species*, but must have originated in *two or more distinct, and often partly contemporaneous, species*. It is also evident that in this case the appearance of man must be thrown back some hundreds of thousands of years.

Professor Klaatsch has given a concrete form to this theory—the “polyphyletic” theory—of human origins by supposing that there are at least two distinct lines of human descent, one of which is distinguished by an element of the gorilla, the other by an element of the orang-utan. He does not mean, of course, that either race is descended directly from the gorilla or orang-utan, but that one included an ancestor common to itself and the gorilla, the other an ancestor common to itself and the orang-utan. The idea has not been favourably received by experts in this particular form, but a belief in some sort of multiplicity of origins for mankind is gradually gaining acceptance. It may be added that there seems to be some evidence of a similar multiplicity of origins in the case of the horse and the Peat-hog.¹ Professor Scott Elliot occupies an intermediate position. In the sense that he believes in a single ancestor only, he describes himself as a Monogenist. He points out, however, that, with other animals, the first known representative is usually followed in the next geological epoch by a number of species. He places the

¹ Duckworth, *Prehistoric Man*, 135-9.

human ancestor in the Pliocene; and as he finds in the Pleistocene at least three forms of man, he would expect to find a specialised primitive race in every marked climate-region of the earth. In this sense he calls himself a Polygenist.¹

Professor Keith suggests, as a working hypothesis, that the anthropoid apes had branched off from the ancestral humanoid stem, at some period in pre-Miocene times. The human stem which remained then proceeded on its own development, and in its turn threw off branches. These branches were all human, but they represented different *species* of humanity. In this way *Pithecanthropus*, Neanderthal man, and *Eoanthropus* originated; while the later branches of the human stem are represented by the present African, Australian, Mongolian, and European races.² It must not be supposed, however, that the branches which have been discovered were the only ones thrown off either by the human or the humanoid stem. *Palæopithecus*, *Pliopithecus*, and *Dryopithecus*, are instances of shoots, or subshoots, now extinct, which issued in Pliocene or Miocene times from the latter, and we may well suppose that similar shoots, at present unknown to us, have issued from the former. Professor Keith remarks: "The three or four human types so far discovered represent but a few fossil twigs of the great evolutionary tree. We may hope to find many more branches."³

The whole process is, indeed, aptly compared with the growth of a tree. In this several branches issue from a single stem; some of the branches again divide, and all throw off lesser shoots and twigs.⁴ The various branches and other offshoots do not coalesce; each pursues its own growth and development independently, but all spring ultimately from the same source. In like manner, the great common stem of monkey and man threw off from time to time independent branches, which may be re-

¹ Scott Elliot, *Prehistoric Man*, 82.

² *Antiquity of Man*, 497-511.

³ *Ib.*, 506.

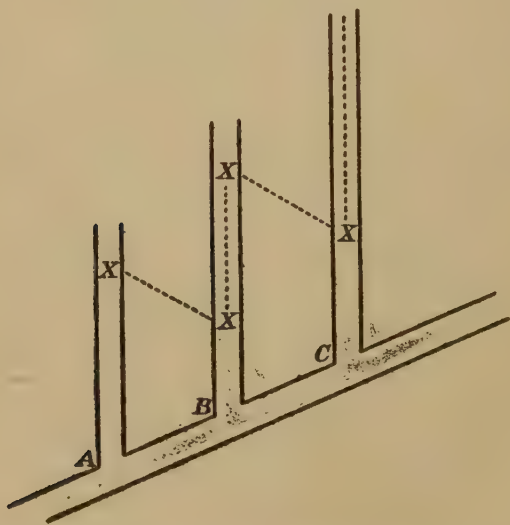
⁴ "Branches of the tree of life often terminate in a brush of points, not necessarily in a single point" (Wiley, *Convergence in Evolution*, 48).

garded as so many efforts of the stem to realise its full possibilities. These efforts did not merge in one another, but each seemed, as it were, to strengthen the stem for the next.

Till more branches are discovered we must be chary of positive conclusions, but the facts so far ascertained furnish, or, at least, suggest, a satisfactory solution of the problem before us. The various species of human and humanoid beings which seem to have coexisted during the early periods of human evolution would supply a corresponding variety of brains. Interbreeding between species of the same order, if this should have been possible, would have introduced further variations both in size and complexity, and accordingly we may well suppose that in this comprehensive collection there might easily be found the intermediate brains needed to fill the gap between the anthropoid and the human. These missing links cannot be found in any existing orders of anthropoid apes; they will be found, if at all, in lost branches, humanoid and human, of the original stem. It does not seem to have been Nature's plan to produce a series of gradually improving *types* of brain in a *direct line*. She seems, rather, to have achieved her purpose by throwing off a succession of shoots each rather higher in type than the first. In this way a graduated series of brains would be produced, but it would be a series of which the members were not *lineally* related to each other. Though all originated in one stem, the relationship between them would be rather that of brother or cousin than that of father and son, ancestor and descendant.

This may suffice to satisfy the physical side of the difficulty. If the theory be correct, it will give us the necessary number of intermediate brains; but the psychical side still remains to be considered. The intermediate brains progress, not altogether on a single branch, but on a succession of branches—branches of which the earlier ones often overlap the later ones. To that extent, therefore, the branches will exist contemporaneously. Brain evolution, in fact, does not advance along a single line, but on a number of successive lines. One branch takes brain evolution to a certain point, where it remains stationary on that *branch*,

and its further progress is taken up by a subsequent branch from the original stem. Now, the brains die with the physical organisms of which they form part, but the mind-structures which functioned in them do not die. What is the course of their evolution? It is true that the brains of a particular species may, in a comparatively short time, advance in size and complexity under the influence of a changed environment or new stimuli, but notwithstanding this, they cannot advance beyond the level appropriate to the species. A gorilla's brain, for instance, will always be the brain of a gorilla, though there may be differences of development between individual gorillas. Hence the way to an indefinite advance on the line of the particular species is blocked. But though the mind-structure cannot, for want of a suitable brain, advance straight upwards, it may be able to move upwards obliquely, by migrating, transversely as it were, into a higher contemporaneous branch. The figure below may serve to explain my meaning.



Here the mind-structure *X*, having reached a certain point in branch *A*, may pass into *B* at an appropriate level, follow its course for some way, and then pass over into *C*. The methods of this migration are discussed in a later

chapter (Chapter XI.), and need not detain us here. It is the fact, not the methods, of migration with which we are immediately concerned. For if the existence of the requisite intermediate brains be, as it appears to be, a probable surmise, and the migration of mind-structures between them be reasonably possible, the apparent gap between the anthropoid apes and man will be bridged. In this case there will be no need to discredit the mental and physical evolution of man merely because the geological record does not completely establish it.

NOTE.

The Theosophical explanation of the "missing link" difficulty is extremely interesting and ingenious. Briefly, it is somewhat as follows: The evolution of man is not confined to our own planet, but it is carried on through a system of seven planets. Life, however, is only to be found in one of these at a time. The stream of life flows on through each of them in turn, and through these successive worlds all individuals pass. Beginning, say, at Planet No. 1, the life-current in due course overflows, as it were, into No. 2, leaving No. 1 lifeless, and so on throughout the series. After No. 7 has been passed, the tide of life re-enters No. 1, but at a *higher level*. For its course, with all the living entities which compose it, through the planetary system is not *circular*, but *spiral*. It may be compared to the thread of a screw. Now, the thread of a screw, which is a uniform inclined plane in reality, looks like a succession of steps when examined only along one line parallel to its axis."¹ Consequently, the missing links ought to be sought, not in any of these apparent steps which face us, but in the worlds which belong to the other side of the screw. This doctrine, of course, can neither be proved or disproved by ordinary methods, but regarding it only as a theory, it suggests an apt explanation of the dearth of intermediate forms, which has always been felt to be a difficulty by evolutionists. In connection with this theory of the spiral course of the life-wave we may take note of an analogue in the realm of matter—namely, that the orbit of the Earth round the Sun is spiral.²

¹ Sinnett, *Esoteric Buddhism*, 35.

² Flammarion, *Popular Astronomy*, 50.

CHAPTER X

THE MARK OF THE MAN

WE have taken the attainment of self-consciousness as the period to which the dawn of the soul must be referred, and with the appearance of the soul, man definitely emerged from the ranks of his lower kinsfolk. For though the evolution of man is, like all evolution, a process of orderly gradation, the appearance of self-consciousness is something more than a new step: it heralds a new departure. The extraordinary increase in the size and complexity of brain which preceded and accompanied it, and the corresponding development of man's mental capacities, has made the difference between him and the lower animals a difference of kind rather than of degree. To take a single instance, his superior mental powers have enabled him to evade to a great extent the operation of Natural Selection. As Sir E. Ray Lankester puts it:

"Nature's inexorable discipline of death to those who do not rise to her standard—survival and parentage for those alone who do—has been from the earliest times more and more definitely resisted by the will of Man. . . . We may say that Man is Nature's rebel. Where Nature says 'Die!' Man says 'I will live.'"¹

The development and operation of a mind, however, cannot be studied *in situ*. They can only be measured by external results. What, then, if any, is the outward and visible sign of that mental development which has raised man for ever above the beast? There can be little doubt as to this. The same answer comes from all sides; for on all sides it is admitted that speech is the distinctive faculty of Man.

¹ *The Kingdom of Man*, 26.

"Science separates man, mainly in virtue of his exclusive possession of articulate speech, from other animals to whom the reasoning faculty can scarcely be denied."¹

"If" (says Dr. Bastian) "in attempting to bridge in the faintest way the great intellectual and moral gap which sunders man from the highest of the inferior animals, we say that he alone is possessed of the power of speaking and of using Articulate Language, we probably fix upon that power which, infinitely above all others, has had to do with the gradual progress that seems to have taken place during the lapse of ages."²

Nevertheless, in spite of a general recognition of the importance of speech, there is a certain amount of misunderstanding as to its history. It is often supposed to be entirely mental in character, and to be directly and solely related to the intelligence or the intellect. Here as elsewhere, however, the progress of the mind-structure and its physical vehicle are closely linked together, and, as a matter of fact, speech is intimately connected with the physical formation of the head and face. The original object of the jaw was mastication; and in the anthropoids it is carefully framed for this purpose, but not adapted for speech.

"In order to allow a free movement of the tongue and of other parts concerned in speech movements, the lower border of the jaw, which bounds the floor of the mouth, has opened out in modern man."³

To the same effect Keane writes:

"Language, like man himself, had a very humble beginning, and has reached its present marvellously perfect state *sensim sine sensu*, slowly improving in its phonesis and structure hand in hand with the slow improvement of the physical organs in virtue of which man has become a speaking animal. Its inner mechanism is analysed by the comparative philologist, and found to be reducible to simple elements, and this conclusion is confirmed by the comparative anatomist, who points out with Dr. Arthur Keith that the facial organs of speech are non-existent in the anthropoids, rudely developed in fossil man, and perfected only in later ages."⁴

It appears on the same authority that the mental (*mentum*, the chin) lines of the anthropoids are different from those of man, in that they turn up in front of the inferior canine teeth and enclose between them a quadrilateral space,

¹ Keane, *Ethnology*, 16.

² *The Brain*, 411.

³ Keith, *Ancient Types of Man*, 83.

⁴ Keane, *Ethnology*, viii.

while the corresponding space in man is triangular. In anthropoids the quadrilateral space

"retreats rapidly downwards and backwards, a feature in which fossil man resembles apes much more than modern man, and shows also, I think, that fossil man was less highly adapted for speech."¹

The anthropoids, therefore, do not speak, partly, at any rate, because they cannot. But this incapacity for speech does not by any means imply incapacity for thought. Nowadays, it is true, we can hardly imagine any idea which is not thought of or conceived in words. It is quite possible, however, that, in the earliest stages of thought which preceded language, ideas may have been presented to the mind under other symbols than words. Traces of this stage may even yet linger in the lower depths of our consciousness. Myers considered the curious arabesques known as Spirit Drawings to be attempts of the subliminal self to express itself in a symbolism other than language.² A word is an artificial sign wherewith we indicate an idea; but there may well be natural signs which perform, though less adequately, the same function. J. S. Mill, Comte, and others, have supposed that the *visual* images called up by many of our mental impressions are natural signs which might be so utilised by a primitive mind. Thus, before there was a word for lion or storm, the visual images connected with them respectively might suffice for the simple reasoning about them of which alone such a mind would be capable. Even a mere feeling might operate in a similar fashion, and that, too, not with man alone, but with some of the lower animals. On this point Mill observes:

"Any strong and highly interesting feeling, connected with one attribute of a group, spontaneously classifies all objects according as they possess or do not possess that attribute. We may be tolerably certain that the things capable of satisfying hunger form a perfectly distinct class in the mind of any of the more intelligent animals: quite as much so as if they were able to use or understand the word 'food.'"³

But, of course, the enormous value of language lies, not so much in the aid which it gives to the formation of thoughts

¹ Keane, *Ethnology*, 426.

² *Human Personality*, Abridged Edition, 78.

³ *Mill on Hamilton*, 329.

and ideas, as in the power which it confers of communicating them to others. And it is certain that the complete evolution of speech and language was preceded by humbler efforts in the same direction. Among the lower animals intercommunication of a rudimentary kind seems to a certain extent to take place by means of vocal sounds adapted to convey broad expressions of fear, love, menace, and so forth. But utterances of this kind could only serve as expressions of emotions, and corporeal gesture would often be found a more effective mode of communication. Colonel Garrick Mallery points out that even among the lower animals their gestures are more distinctive than their cries. Thus:

“The gestures of the dog are far more readily distinguished than his bark, as in his preparing for an attack, or caressing his master, resenting an injury, begging for food, or simply soliciting attention. The chief modern use of his tail appears to be to express his ideas and sensations.”¹

All animals, this author thinks, probably understand human gesture better than speech, and can frequently be taught by the former where the latter has failed. The gestures of monkeys are, as might be expected, closely akin to our own. Even in the case of children their gestures are intelligent long before speech is acquired; and the insane often understand and obey gestures when words have no meaning to them. Gesture, therefore, undoubtedly preceded speech, and even when speech appeared “it remained rudimentary long after gesture had become an art.”² Gesture would certainly be, for instance, a far more effective means of indicating motion, position, direction, and even invitation or threat. Gesture, therefore, particularly gesture of the hand, may be regarded as an important form of pre-articulate language; and perhaps we hardly recognise how strongly it still survives, not only among the lower races—*e.g.*, the Aborigines of South America—but also in the more emotional types of the higher races—*e.g.*, the Neapolitans. Indeed, most of us fall back upon it at once when we attempt to converse with people whose language we do not understand.

¹ *Bureau of Ethnology*, i., 275-6.

² *Ib.*, 284.

Now, the employment of gesture as a method of conveying ideas had an important bearing on the development of speech. For the operation of communicating ideas became associated in the brain with the movements of the hand which was most commonly employed in gesture language. With most people the hand employed for this purpose is the right hand. It is not very easy to find a satisfactory reason for the almost universal preference given to the right hand. The principal explanations have been collected by Mr. Jackson in his work on *Ambidexterity*, chapter iii. Sir James Sawyer in 1900 suggested that the normal position of the heart is the efficient cause, "or, at least, a chief cause of the prevalent right-handedness": his theory being that, in the conflicts of primitive man, the right hand was preferred for wielding the weapon, so that the heart might be kept as far as possible from the assault of the enemy.¹ Others ascribe it to a hereditary impulse, but that does not explain the origin of the impulse. Professor Buchanan of Glasgow finds a mechanical explanation for it:

" 'The inclination of the centre of gravity of the body to the right side confers a mechanical advantage on the limbs of the right side in their complex movements, while it is mechanically disadvantageous to the limbs of the left side in the analogous movements which they perform.' This law, he observes, is based on the following premises: (1) The centre of gravity of the body is situated, not in the mesial plane, but to the right of it. (2) A deep inspiration is necessary to every great muscular effort. (3) There is a shifting of the common centre of gravity of the body obliquely backward and to the right on making a deep inspiration. (4) More general view of the utility of the act of inspiration in shifting the position of gravity in subservience to the movements of the body. (5) The kind of respiration which accompanies the action of the limbs of the right side is more favourable to sustained muscular exertion than the respiration which accompanies the action of the limbs on the left side; and the argument he gives in these words: 'It thus appears that the preferential use of the right hand is not a congenital, but an acquired, attribute of man. It does not exist in the earliest periods of life.' "²

Sir Daniel Wilson disagrees with this theory, but he admits that the grounds given for it by Professor Buchanan

¹ *Ambidexterity*, 55.

² *Ib.*, 58-9.

may possibly contribute "a slight predisposing cause leading to a preferential use of the right side."¹ This is surely enough; for a predisposition, however slight, would be enough in the long-run to bring about a general right-handedness.²

But be this as it may, the hand, whether right or left, commonly employed for gesture would be what we have called the "working hand" (Chapter III.); and the working hand is closely connected with the working hemisphere of the brain. Now, the area of the brain with which these movements are connected is known as Broca's Convolution—that is, the third frontal convolution of the brain—and it is in Broca's Convolution that we also find that portion of the brain which is devoted to speech. It is a small patch about the size of a nut, and if this be destroyed the faculty of speech goes with it.³

The growing intelligence could *think* long before it could give articulate utterance to its thought. Thought—indeed, sometimes rather elaborate thought—is obviously possible to many dumb animals. But when the gradual development of the proper facial organs made speech possible for man, this function naturally became located in that part of the brain which was connected with the gestures to which the communication of thought had previously been entrusted. Moreover, the brain-centres which preside over the movements of the hand in the motor area of the brain are close to those which govern the movements of the face, lips, and tongue; and hence an associated action between hand-gestures, lips, and tongue, naturally arises.

¹ *Ambidexterity*, 61.

² In the case of the Rev. T. C. Hanna, reported by Dr. Sidis (*Psychology of Suggestion*, chapter xxii.), the patient, a healthy and highly cultivated man of twenty-five, was picked up after a carriage accident in a state of unconsciousness. When he "came to himself he was like one just born. He lost all knowledge acquired by him from the date of his birth up to the time of the accident" (*Ib.*, 217). He was in every respect a mere infant, and had to relearn the entire lesson of his daily life. It is curious to find, in this connection, that, in learning once more to write, he showed himself to be ambidextrous, a quality which he did not possess before the accident.

³ Thomson, *Brain and Personality*, 94.

"Man does not speak because he thinks" (says André Lefevre); "he speaks because mouth and larynx communicate with the frontal convolution of the brain."¹

And here we find further proof that it is a thinking something which uses the brain for its own purposes, not the brain which "secretes" or otherwise produces thought. For, as we have already seen (Chapter III.), there is a cross-relation between the brain and the body, by virtue of which each cerebral hemisphere is associated with the muscular movements of the *opposite* side of the body. Accordingly, in right-handed persons the movements of the right hand are associated with Broca's Convolution in the left hemisphere, and here, and here only, is found an area of speech. Conversely, in the case of left-handed persons the speech area is found in the Broca's Convolution of the right hemisphere only.

Now, each hemisphere, be it observed, has its Broca's Convolution, and each is therefore equally well equipped for the purposes of speech. Consequently, if speech was anything like a "secretion" of the brain, if it was a faculty arising wholly from the reaction of Broca's Convolution to nerve stimuli, each hemisphere would possess a speech area. Yet it is only the "working" hemisphere which does possess one, and the working hemisphere is found to be that which is associated with the chief gesture-making hand. Speech, therefore, had a motor origin, and it still keeps up the old connection. Nevertheless, it is in every case an *acquired*,² not an *innate* faculty of speech, but only with a potentiality of acquiring it. Broca's Convolution by itself obviously does not give the power of speech, since this convolution in the non-working hemisphere cannot produce speech at all. The faculty, therefore, has to be acquired, and it is acquired under the influence, not of mere physical stimuli, but of intelligent impulses.

The connection of the hand with Broca's Convolution is curiously illustrated by some of the effects of artificial ambidexterity. Teachers often attempt to teach left-handed

¹ *Race and Language*, 3.

² Weismann, *Essays upon Heredity*, 269; Bastian, *Origin of Living Matter*, 129; Dendy, *Outlines of Evolutionary Biology*, 156, 184.

children to use the right hand for writing and other purposes, and this conscious educative attempt may succeed (partially at any rate), but it is frequently followed by injurious results to the pupil's speech. Mr. P. B. Ballard, one of the School Inspectors of the London County Council, found that the result of trying to make left-handed children right-handed was to cause them to stammer.¹ A short time ago the Assistant-Secretary for Education presented to the Carnarvonshire Education Committee a report which confirmed Mr. Ballard's experiences. It gave instances of school-children, naturally left-handed, who developed a marked impediment in their speech when forced to use the right hand. Professor Culverwell is quoted as saying:

"The speech-centre nerve is on one side or other of the brain, according as the right hand or the left hand is most used, and especially in children, a second speech-centre may be set up on the unused side of the brain, if by any chance the original centre is destroyed. . . . If we made a left-handed boy employ his right hand, especially for matters connected with speech, the result might be to set up a second and imperfectly organised speech-centre on the other side of the brain *pari passu* with the use of the right hand."²

This suggestion does not indicate, of course, that artificial activity of the non-working hand could confer the *faculty of speech*, but that, when the faculty has once been acquired, it may, to some extent, succeed in preparing a new speech-centre in which the faculty could operate.

In the case of primitive man the impulses to speech originated in the struggles of his own intelligence to communicate its ideas. In the case of the modern child they are supplied in the first instance by the direct educational efforts of parents and teachers; but these are addressed to the child's intelligence, which co-operates with them in evoking the faculty of speech. It is natural enough that such impulses should appeal to that area of the brain which has been already prepared by gesture-language to become the centre of speech. But though the particular brain-area has been modified and trained in this manner by gesture activity, the real cause of its modification is not the gestures

¹ *Pall Mall Gazette*, December 5, 1913.

² *Morning Post*, February 12, 1915.

per se, but something which is behind them. Mere aimless gestures could no more effect this modification than the aimless stimuli of light waves can produce a knowing area in the precuneus (see Chapter III.). Moreover, language of any kind involves not only the existence of something like an idea, but also a desire to communicate that idea to other individuals. Now, it is possible to suppose that an idea may be produced as the result of a series of mental impressions, though it is not very easy to understand how even this can be effected without some regulating principle in the mind to group, adjust, and co-ordinate these. But it is quite impossible to conceive how *a desire to communicate the idea* can be originated simply by the series of mental impressions which produce the idea. Repeated mental impressions of a lion may give rise, even in the mind of an animal, to some sort of idea of a lion. But how can they give rise to a desire to communicate this idea? That impulse must come from another source, and this source must be some thinking principle. It is intelligible enough that, when speech first appeared, its special area should be located in that region of the brain which was already appropriated to the gesture-language which speech superseded. But the development of this area, and the speech thereby made possible, are obviously the results, not of the mere gestures employed for communication, but of the purpose which employed the gestures as its instruments.

What, then, is the explanation to be given of this association between the working hemisphere and the working hand, between mental and physical activity? In the first place there seems to be a direct connection between bodily movements and the development of the brain, both in size and complexity.¹ This is shown by the large and highly convoluted brains of such creatures as the shark, the dolphin, and the porpoise, whose lives require the continuous execution of rapid and varied movements.² And this increased development appears not only in the cerebellum, the principal motor centre, but also in the cerebral hemispheres. Upon this Bastian remarks:

¹ Spencer, *Principles of Psychology*, i., 192.

² Bastian, *The Brain*, 316.

"It is a fact generally observed, that Sensorial Activity, and therefore intelligent discrimination, increases with an animal's powers of Movement; and secondly, there must be special parts of the Cerebral Hemispheres devoted to the mere Sensory Appreciation of Movements executed. The nerve elements lying at the basis of this latter appreciation, however they may be distributed through the Hemispheres, would naturally be the more developed (and, consequently, all the more calculated to help to swell the size of the Cerebrum) in proportion to the variety and continuance of the Movements which the animal is accustomed to execute."¹

The late William James pointed out that all mental states are followed by bodily activity of some sort, even if this were no more than inconspicuous changes in breathing, circulation, general muscular tension, and glandular or other visceral activity.² So, too, M. Bergson declares that there is an obvious relation between mobility and consciousness, and that an animal is conscious in proportion to its power to move freely.³

Since, then, bodily movements in general tend to produce a general enlargement and development of the brain, and a corresponding increase of intelligent discrimination, it is natural that any special activity should tend to produce a special development in the particular cerebral area with which it is associated. This seems to be the explanation of the predominant capability enjoyed (in the case of right-handed persons) by the left hemisphere, which is apparently indebted for its exceptional powers to the exceptional activity of the right hand. And as the activity of the right hand quickens and enlarges the *general* possibilities of intelligence in the left hemisphere, we should expect to find that any *special* and limited activity, like the use of the right hand for gesture-language, would bring about the formation of a *special* centre to deal separately with its requirements, which would in time become the speech-centre.

But, it may be said, the fact that cerebral development follows muscular activity, and increased intellectual capabilities follow cerebral development, shows that intellectual capacity is not due to any external intellectual principle,

¹ Bastian, *The Brain*, 27-89.

² *Text-Book of Psychology*, 5.

³ *Creative Evolution*, 118.

but is simply an outcome of physical development; that mind is a mere product of matter, and, consequently, that speech, like any other intellectual faculty, arises by itself in cerebral tissue of a requisite complexity, being just a function of such tissue and nothing more. The answer is that, though muscular activity—in this case the activity of the right hand—may give the capacity for speech, it cannot possibly give the language which is spoken. This must proceed from some intelligent source distinct from the tissue. Moreover, it is found that, as new languages are acquired, new *word-areas* are developed in the brain. The new words are acquired first, the new areas are formed later. If speech were merely a product of brain-tissue, we should expect this order to be reversed. The formation of these new areas does not entail any increase of manual activity, which would certainly be the case if the language was produced by such activity. On the contrary, they come into existence under *intellectual pressure* entirely, and manual activity has merely prepared the material for their formation. For it is obvious that the essential element of speech is not the power of uttering words—a parrot can do that—but the power of forming them with definite meanings attached to them: the power, in fact, of making them symbols to represent ideas. Now, in this connection Dr. Thomson points out that words must be divided into two kinds:

1. Words which come to us—

(a) By sight,

(b) By sound;

And

2. Words which proceed from us (motor speech)—

(a) In speech,

(b) In writing.¹

These two kinds of words have separate brain-registries, as is shown by cases of word-blindness, word-deafness, and word-speechlessness. In cases of word-blindness, for instance, the patient can speak, hear, and understand words,

¹ *Brain and Personality*, 92-3.

but, *though he can see everything else*, he cannot see words. Dr. Thomson compares these various registries to shelves in a library. When a man learns a new language, another shelf is added to this brain library. And it often happens that one shelf gets injured, while the others remain intact. In a case of word-blindness reported by Professor Hinshelwood of Glasgow, the patient, who was English, also knew Greek, Latin, and French. The English shelf was almost ruined, the French and Latin more or less seriously injured, but the Greek shelf escaped entirely, and the patient could read this language without difficulty. A similar case is reported in the *Lancet* of February 8, 1902. All these varieties of word-centres are obviously new acquisitions produced by the operation of the intellect on the brain; and, consequently, it is almost an irresistible inference that the original speech-centre was produced in the same manner.

We have now traced the path, weary and tortuous enough, by which consciousness has patiently struggled up to self-consciousness; and with self-consciousness the individual soul appears. Evolution being as a rule gradual, it is difficult to fix any precise point at which self-consciousness supervened upon some of the mental structures which had been slowly attaining the necessary conditions. But we may fairly surmise that, while it cannot have been later than the acquisition of articulate speech, it can hardly have been much earlier. In the first foreshadowings of speech—the uncouth utterances of the lower animals—we may indeed hear spirit crying half-unconsciously to spirit; but the intelligence from which these spring, though perhaps in some sort a “Me,” cannot possibly be an “I.” Such a creature is, doubtless, vaguely aware of itself as something distinct from its surroundings, but soul is not revealed till the intelligence can declare that is *I* who am aware.

Moreover, though evolution, regarded as a whole, is gradual, it does not always proceed with unbroken continuity.¹ The tide advances, but each individual wave retreats, to make way for the successor which shall outstrip

¹ See, for instance, the “Mutations” observed by Dr. Vries.

it. And so it may well be that self-consciousness was borne in, when intelligence had become ripe for it, in full completeness, on the crest of a single wave. In this sense, though the preparation for it had been long and gradual, the actual emergence of soul would be swift and sudden: a single supreme event which would raise man at a bound irrevocably above the level of the lower intelligences, and plant his feet on the path of human destiny.

CHAPTER XI

SUBHUMAN CONSCIOUSNESSES

HUMAN self-consciousness, when once it has sprung to light, pursues thenceforward a path of its own. But what of the subhuman consciousnesses which are left behind? The problem is one of extraordinary interest and extraordinary difficulty. So long as these consciousnesses are associated with physical bodies, their functions are obvious. But what happens when such physical bodies die? What possibilities of progress are open to these discarnate consciousnesses? what functions do they discharge? what is their place in the scheme of things? Do they retain, for a time at any rate, a separate existence, or are they reabsorbed, as Sir Oliver Lodge thinks all terrestrial life is reabsorbed, into some general reservoir of vitality,¹ or, as Theosophy teaches, into a sort of tribal reservoir of the same kind?² In any case it seems that, if these lower consciousnesses are to advance at all, their evolution can only be effected by some system of reincarnation. As far as we can see, development into self-consciousness is only possible, on this earth, through some anthropoid forms. If this be so, every consciousness which is to develop into a soul must find its way into this narrow path. Yet the difficulties of doing so appear stupendous. For, in the first place, the vast majority of these lower consciousnesses are far below the anthropoid level. It is impossible, for instance, to suppose that the consciousness of a beetle could fulfil the mental requirements of a gorilla. But, more than this, even the higher forms of these lower consciousnesses mostly belong to physical species widely separated

¹ *Life and Matter*, 149.

² *Sinnett, Growth of the Soul*, 445-6.

from the anthropoids, and furnished, accordingly, with a different class of brain. Consequently, even if they are spiritually and intellectually equal to the task, physical obstacles—obstacles which at present appear to be insuperable—would incapacitate them from functioning in anthropoid brains. If all physical species were linked together in one continuous series, the transition of a consciousness, step by step, from the bottom to the top of the series might be possible. But as a rule the different species are sharply divided, and there are no intermediate links—with correspondingly intermediate brains—by means of which a consciousness could pass from one species to another. Since, therefore, the anthropoid line cannot be independently reached either immediately or gradually by any of the lower consciousnesses outside it, their possibilities of upward progress seem definitely checked. Nor are we yet at the end of our troubles. For even the anthropoids themselves are apparently debarred from any further evolution on this earth. As we have seen in Chapter IX., there is an impassable gulf, both mental and cerebral, between man and the anthropoid apes, and the intermediate forms like *Pithecanthropus*, by which the gulf was formerly bridged, have disappeared. Consequently, the evolution of anthropoid consciousness into human self-consciousness must be regarded either as being for the present in suspense, or as being effected (if at all) in some other sphere of existence.

But with regard to consciousnesses below and outside the anthropoid line, is there no possibility of evolution open to them other than an immediate and complete metempsychosis—the entire consciousness of one animal passing into an organism of a different species—or a series of gradual transitions? M. Fournier considers that animal consciousnesses reincarnate into new animals of the same species, and it is highly probable that this to a great extent does take place.¹ But it will be observed that the process is hardly, if at all, evolutionary; it resembles marking time rather than a forward march, and, moreover, it leaves out of account the animal consciousnesses of extinct series. Perhaps a consideration of the laws of physical growth

¹ *New Light on Immortality*, 191.

may suggest a solution of this problem in the evolution of mind.

The physical basis of all life, animal or vegetable, is, as we have seen, protoplasm. This, however, in the ordinary course of things, is produced by *vegetables alone*. No animal organism is capable of forming it out of the inorganic carbon, hydrogen, nitrogen, oxygen, etc., of which it is composed. This power belongs to plants only, and hence it is from plants only that the protoplasmic tissue of all living things is derived. The vegetable world, in fact, supplies the *formed material* of life for the whole of living Nature. The sheep, for instance, obtains it from the grass, and passes it on involuntarily to man in the mutton chop. It is appropriated by man, and by him applied to the purposes of the human organism; and thus the simple cell of the grass blade may help to build up the physical brain of the poet. In other words, the physical organisms of a lower kingdom serve to provide material for the construction of the organisms of a higher kingdom.¹

And may not a similar law operate in the case of mind? May it not be that here, too, the lower ministers to the higher, and that at some point in the system which stretches from the atom to the man structures arise which require for their mental equipments not—or only—simple mind-stuff, but mind-stuff worked up into what may be called for the moment “mind-plasm.” If so, here is surely a possible field of usefulness for discarnate animal consciousnesses after physical death. Indeed, this possibility extends farther back than the discarnate mind-structures of animals, and includes the chemical and vital mind-structures mentioned in Chapter VIII. It is conceivable, at any rate, that such mind-structures as are fashioned on a lower stage of existence could be appropriated by higher structures, and incorporated by the latter into their own mental systems. The earliest of these appropriating

¹ An analogous process takes place in the vegetable world. Originally the vegetable cell had to fix its own nitrogen; but it is now found that there are certain vegetable microbes which do this duty for the higher vegetable cells, thus performing for them a service very similar to that which the latter perform for the animal world.

structures might only be capable of taking up discarnate chemical mind-structures. But they would be succeeded in due course by others sufficiently complex to appropriate vital mind-structures in a similar condition; and thus the whole mental equipment of a low organism might become a molecule, as it were, in the mind-structure of some higher organism. This mind-stuff molecule might again pass upwards if the mind-structure which appropriated it should be in its turn appropriated by some higher being; and the process may well continue until mind-structures are reached which lie in the direct line of the ascent of man. The mind-structures so appropriated would suffer no retrogressive or destructive change. They have no personality to lose, and the absorption of their individuality into the more complex system of some higher being would be a gain to them rather than otherwise. Under these circumstances the mind-structures of many lower animals might help to compose the mind-structure of a man. This supposition finds some corroboration in certain cases of theroid idiocy, in which the idiot displays not only the mental, but to some extent the physical peculiarities of a particular animal.¹ This is exactly what might be expected to occur in an ill-built mental structure if some of its component mind-structures were, so to speak, to get out of hand, and thus obtain an undue prominence over the rest. Dr. Albert Wilson, from a study of microcephalic brains, came to the conclusion that man could revert to the type, not only of the lower apes, but far below, to the cat and other carnivora, and even to the lower ungulates such as the pig and cow. This is a still stronger case of animal predominance, for he insists that such microcephalic brains are not those of a degraded type of man, but are actual reversions to the lower beasts.²

But, it may be asked, is the human soul itself safe from the possibility of appropriation by some higher being? The idea that the Universe consists of a system of higher and lower order of beings, all duly subordinated to the ruling purpose of the whole, has occurred to various specu-

¹ Maudsley, *Body and Mind*, 47-53.

² *Education, Personality, and Crime*, 76.

lators, ancient and modern. In England it found favour with Petty in 1676, and later with Pope and Soame Jenyns, while a similar theory has lately been advanced by M. Fournier. He considers that the qualities which we observe in matter may, in reality, be the rules of conduct, interaction, and co-operation of living beings of all grades. Consequently, as he points out, the mechanical, physical, and chemical properties which we observe in material things may conceivably originate in the laws of conduct of beings below us in the scale of creation. The individuals in these societies are too minute for our observation, and we can only recognise them in the mass. Similarly:

“A shoal of herrings, a swarm of locusts, a herd of sheep, are masses having a certain consistency, speed, impetus, and inertia, which would appear to us as such if our bodies were magnified to the size of the earth.”¹

And as we utilise the uniformities of the minute material systems to serve our own purposes, so,

“for aught we know, some beings on a larger scale than ourselves may be at the present moment utilising the average mechanical properties of the human race without our being aware of it.”²

Mankind would, in fact, be the atoms, as it were of which the system in which these superior beings move was composed. This scheme, however, suggests no absorption or appropriation of lower mind-structures. Their activities are utilised, but their individualities are left intact; and even those who, with Lord Haldane, deem that men may possibly be but parts of a larger organism, do not rob them of their distinctive self-consciousness.³ Nevertheless, if a race of such superior beings should actually exist, it is conceivable that some of them might be of a sufficiently high order to permit of their assimilating into their own intelligence even the self-conscious individuality of the human soul. It is highly improbable, however, that any such assimilation ever takes place. It would, of course, annihilate human personality, and, so far as can be judged by our imperfect knowledge, the extinction of human personalities would cut at the very root of Nature's plan. For countless

¹ *New Light on Immortality*, 24.

² *Ib.*, 28.

³ *Pathway to Reality*, 81.

ages animal evolution was chiefly confined to the body, inasmuch as, under the conditions of early existence, physical superiority—in strength, swiftness, protective colouring, and so forth—was the most important factor in the struggle for existence. It was therefore upon the bodily characteristics of the animal that natural selection operated most powerfully. But, with the gradual growth of intelligence, the balance between body and mind became readjusted. When intelligence reaches a comparatively high level, slight variations in it bear more directly on survival than variations in physical structure. Consequently, variations in intelligence thenceforward increase, while purely physical variations decrease. At this point, therefore, natural selection began to lose its sway over the physical structure of primitive man, so that the form of his body became practically stationary, while his mind became subject to the selective influences from which his body had escaped. Selection, in fact, was transferred from the body to the mind, with the result that while man's physical character became fixed and almost immutable, his mental evolution went on apace.¹ This in effect is the story of civilisation. The real differences between the highest and lowest of modern mankind are not physical, but mental. Physically an astronomer does not differ materially from a Bushman: their bodies remain alike; it is in mental capacity only that the former has outstripped the latter.

It seems, therefore, that the emergence of self-consciousness marks a definite advance in man's evolution, an essential step forward which he will not be required to retrace. Slowly and patiently Nature toiled on till a physical vehicle had been evolved in which a mind-structure could function as a self-conscious unity. But this result once achieved, the way was cleared for a more distinctive advance. A new departure was taken; a new chapter in the great story was opened. The body having attained the level of development necessary for the appearance of self-consciousness, the self-conscious soul has duly appeared. Now, so far as we are able to detect the general principles of Nature's scheme, it seems that, where its fundamental constituents

¹ Wallace, *On Natural Selection*, 316-7.

are concerned, dissolution or disintegration are as far as possible excluded. The atom, as we have seen, remains (apart from radioactivity) as a permanent material unit which resists all external attempts at destruction. Protoplasm, the vital unit, is not so immune from external attacks, yet apart from these its life is unending. The unicellular organisms which multiply by simple division are, in their own nature, immortal, and the death which befalls multicellular organisms is, as Weismann has shown, merely a later adaptation for the benefit of the species. Passing from matter to mind, we have seen reason to suppose (Chapter VIII.) that the chemical and vital mind-structures which form the mental units of the scheme possess a similar stability, and, indeed, the experiments of Mendel have shown that individual characteristics of living organisms are transmitted to their descendants, not blended or fused, but separately and intact. Consequently, when we come to so high a mental structure as a self-consciousness, we may reasonably infer that this too is a fundamental constituent in the scheme of the Cosmos which is destined to endure in its integrity.

There is, moreover, another consideration which tends to confirm this conclusion. A subhuman mind-structure, if appropriated by a higher consciousness, suffers no loss, no disintegration. It becomes a brick, as it were, in a more imposing edifice, but it retains its identity within that edifice. Its activity is, under normal circumstances, subordinated to the general purposes of the appropriating consciousness, but its specific qualities remain intact, and may, if opportunity offers, assert themselves independently. Its career is in no way prejudiced; on the contrary, it may in this way attain, though in a subordinate capacity, heights together beyond its independent reach. But if the self-conscious human soul were to be absorbed by some higher intelligence, its sense of Egohood, so laboriously acquired, would inevitably be suppressed by its subordination to the purposes of the consciousness which had absorbed it. There are, no doubt, the so-called "colonial" consciousnesses which are ascribed to some forms of early multicellular life; but these belong to a far lower stage of existence

—long anterior to self-consciousness—and, moreover, present quite a different set of conditions. Each unit of the colonial consciousness is substantially equal to its fellows, and between such units a copartnership is possible which would be quite impossible between units so unequal as an appropriating and an appropriated consciousness. It is difficult, then, to believe that, under any intelligent scheme, so complex a product as self-consciousness would be laboriously evolved only to be extinguished again. In truth, as Mr. Schiller puts it:

“The rationality of things could not be asserted against so wanton a waste of energy as would be involved in the destruction of characters and attainments it required so much toil and patient effort to acquire.”¹

But to return to our subhuman consciousnesses. For the majority of these their ascent into higher stages of existence will be brought about, as I have suggested, by their incorporation into superior mind-structures. Till this occurs they will probably continue to reincarnate from time to time in animal bodies of the same species. But under any circumstances it seems likely that they will often be left without any physical tenement, and may spend considerable periods in a discarnate condition. How will they be employed during these discarnate intervals? To what purposes will their energies be applied? Employment of some sort there surely must be. For, on the one hand, it is almost inconceivable that a vast assemblage of consciousnesses, some of them comparatively highly developed, should fail to put forth any energies whatever; and on the other, it is quite out of keeping with the general lines of Nature's scheme that forces of such potency should remain idle and unutilised. Now, in the first place, there is no reason why the process of their development or the sphere of their utilisation should be confined within terrestrial limits. It is difficult to suppose that this Earth of ours is the only seat of life and mind in the Universe;²

¹ *Riddles of the Sphinx*, 367.

² I do not overlook Wallace's views (*Man's Place in the Universe*), but his arguments, I confess, appear to me inconclusive; and, moreover, they are directed, not against the *existence* of life, but against the possibility of its *development* elsewhere (*The World of Life*, 185).

and if there be more worlds than one, it is at least possible that mind-structures should be capable of passing between them, though we cannot detect the laws of their migrations. Behind the veil which divides us from the things not seen there may well be realms for these consciousnesses to traverse which are not accessible to us—forms of activity, openings for usefulness, of which we have never dreamed. Yet even if we confine attention to this world of ours, we can perhaps guess at some of the purposes which discarnate mind-structures may fulfil.

We are accustomed to speak of the *blind* powers of Nature, and in a certain sense the description may pass. Laws of Nature (in the scientific sense) are blind as Justice is supposed to be blind. They do not discriminate between persons; they take no account of motives or intentions. If not demonstrably inviolable, they are, so far as we know, inviolate uniformities of sequence and coexistence. But though in this sense they may be blind, it does not follow that they are wholly devoid of intelligence. The energy which is postulated as the source of all Nature's operations is itself inexplicable. If it is a true hypothesis, it can only be regarded as a metaphysical cause of the physical phenomena which surround us, and as such is much nearer to mind than to matter. From this point of view, therefore, the powers of Nature may well be the outcome of a higher purpose; in other words, we may reasonably consider that the "laws" of Nature are the decrees of God. If this be so, may we not further surmise that a Divine intelligence would, as far as possible, use intelligent instruments to carry these decrees into effect, and that the energy required for the operations of Nature may in some cases be supplied by lower consciousnesses acting under the control of the Divine Will, as intermediate instruments between that Will and Matter?

Again, may not some of the rarer powers of the human consciousness be exercised by the aid of these consciousnesses? Take, for instance, the various forms of telepathy. If between persons on opposite sides of the Atlantic—or for the matter of that on opposite sides of the room—there is a mental gap as complete as the spacial gap which divides them, it is impossible (on the current theories of mind)

to conceive how telepathic communication can take place between. How can there be an *actio in distans* between mind and mind? How can the perceptions, the emotions, or the ideas present to the one consciousness be transmitted across a mental vacuum to the consciousness of the other? But the difficulty would be greatly diminished if space should contain some suitable media by which the two could be connected. Such media must, of course, be of a mental character, and discarnate mind-structures, even of a low order of development, would answer the purpose. In such a case it would not be in any way necessary that the mind-structures acting as the transmitting media should apprehend the meaning or significance of the message transmitted. The changes or impressions produced on the transmitting media by the transmitted idea need not be faithful reproductions of that idea as present to the consciousness at either end of the chain of transmission. The operation may well resemble a telephonic message. In this the words spoken by the sender produce waves in the air, which, by causing the diaphragm of the transmitter to vibrate, produce variations in the strength of the electric current, which by a magnetic contrivance produces vibrations in the receiver at the other end of the telephone, which in their turn produce air-waves, which finally render up to the hearer the words originally spoken. Here there are words at each end of the chain, but assuredly none in the middle; and a like explanation may apply to the transmission of ideas. Nor is telepathic transmission of ideas necessarily confined to man. Anyone familiar with animals must have been struck by their faculty of apprehending each other's ideas with a readiness which is out of all proportion to their apparent means of intercommunication. Vocal sounds and bodily gestures may do much, but they can hardly be adequate to deal with the elaborate communications which sometimes seem to pass between animals. It is at least possible, therefore, as some have thought, that telepathy is employed by the lower animals to supplement their defective means of communication by voice or gesture.¹ Myers defines telepathy as the power which life

¹ Hudson, *The Evolution of the Soul*, 23.

has of manifesting itself to life;¹ and Bergson gives a similar explanation of instincts. He suggests that animal instincts really rest on a direct insight into life and its needs. Nor is this insight confined to the life of the particular species to which the creature belongs: it extends to the life of other species with which it has relations. By way of illustration he takes the paralysing instinct of certain wasps. These lay their eggs in spiders, beetles, or caterpillars, which they have first paralysed by judiciously planted stings.² The victims thus treated will go on living but motionless for a certain number of days, and thus provide the larvæ, when born, with fresh food. The wasp's object is to paralyse without killing, and the instinct which reveals to it the condition of its own life gives it a direct insight into the vital conditions of its victim, informing it where to sting. It is, in fact, a sort of "sympathy," as M. Bergson puts it, which teaches the wasp "from within, so to say, concerning the vulnerability of the caterpillar."³

These explanations are probably on the right lines, but they do not get rid of the original difficulty. They may be correct accounts of the nature of the process, but they do not explain its mode of operation. Life may have the power of manifesting itself to life by some process which is independent of the ordinary media of communication; but if these are excluded, what is to take their place? What is the medium through which the manifestation is made, or through which the grim "sympathy" of the paralysing wasp acquires its information? Obviously it must be something of a mental character, something which is akin to consciousness. And here, again, we may turn, perhaps, to the material world for a hint as to the configuration of the world of mind. In the former we find material objects surrounded and permeated by the ether which is the raw material of matter. And so it may be that the world of mind consists of mind-structures situated in a surrounding sea of the mind-stuff which, as we have seen reason to think,

¹ Myers, *Human Personality*, Abridged Edition, 187.

² This has been questioned by Mr. and Mrs. Peckham (*Wasps, Social and Solitary*).

³ *Creative Evolution*, 181-3.

may be the raw material of mind. This combination of mind-structures and the material of which they are composed may be regarded as analogous to the combination of nerves and neuroglia, and would constitute a medium through which telepathic and similar information might pass from one consciousness to another.

M. Fournier's conception of an ascending scale of being calls up a vivid picture of realms of life and consciousness stretching immeasurably beyond the limits within which we are wont to confine them. If this picture be in any degree true, it is clear that subhuman and perhaps other consciousnesses may play an important part in the system to which we belong; but it must be freely admitted that there is little direct evidence to corroborate it. Eminently probable as its main features seem, no satisfactory proof of their actuality is forthcoming. Nor is this surprising. The different orders of incarnate consciousnesses in Nature's scheme appear to have normal limits beyond which they do not—or do not ordinarily—range. It is only (at any rate in the case of man) when the normal consciousness is to some extent superseded by the subjective or subliminal consciousness that experiences of this hidden realm begin to emerge. Science has of late taken serious notice of the subliminal consciousness, but it is not disposed to admit that its testimony is veridical. This disinclination is natural, and to a certain extent deserves to be respected. We must undoubtedly be on our guard against the hallucinations and illusions of a mind diseased, yet, at the same time, we ought not to lose sight of the distinction between a morbid representation of the normal consciousness and a representation of the subliminal consciousness, which, though abnormal, is not necessarily false. Indeed, even an unsound consciousness need not be on that account a lying witness. Dr. Maudsley in a striking passage says:

“What right have we to believe Nature under any obligation to do her work by means of complete minds only? She may find an incomplete mind a more suitable instrument for a particular purpose.”¹

It is no conclusive objection to the reality of an abnormal experience that the mind of the experiencing individual is

¹ *Natural Causes and Supernatural Seemings*, 57.

diseased. This merely means that his consciousness is unfitted for its ordinary terrestrial functions: it does not follow that his experiences in this condition may not let him deeper into truths beyond the range of his ordinary consciousness.

“When we speak disparagingly of ‘feverish fancies,’ surely the fever-process as such is not the ground of our disesteem—for aught we know to the contrary, 103° or 104° Fahrenheit might be a much more favourable temperature for truths to germinate and sprout in than the more ordinary blood-heat of 97 or 98 degrees.”¹

Perhaps we may go further still, and suggest that it is not only possible, but probable, that the abnormal will present itself more readily through a morbid than through a perfect mind. Every manifestation of the abnormal involves a struggle of the subliminal consciousness to force its way through the supraliminal consciousness by which it is ordinarily controlled. In such a struggle we may well suppose that it would find its easiest egress along some physiological route whose efficiency was permanently or temporarily impaired, such a route offering a line of the least resistance to its efforts. This is the meaning of the theory formulated by Myers, that

“it may be expected that supernormal vital phenomena will manifest themselves as far as possible through the same channels as abnormal or morbid vital phenomena, when the same centres or synergies are involved.”²

In any case we are bound to recognise that if the abnormal is capable of being known at all, such knowledge is only possible to an abnormal consciousness. Now, the subliminal consciousness is a well-established psychological entity, and can properly be described as an abnormal consciousness. It is concerned with a realm which to the ordinary or supraliminal consciousness is closed. Probably it supervises those workings of the bodily organs—digestive process, gland secretions, and so forth—which the supraliminal consciousness cannot apprehend. It works unceasingly, but it works unseen, because the construction of our bodily organism is not adapted to permit of its full

¹ James, *Varieties of Religious Experience*, 15.

² *Human Personality*, Abridged Edition, 255.

manifestation. Speaking generally, it only rises to the surface and becomes revealed when the ordinary consciousness is from some cause temporarily in abeyance. It seems clear that it can sometimes be brought into supraliminal operation by intoxicants or anæsthetics, and the late Professor James made some personal experiments on this aspect of nitrous oxide intoxication which have an interesting bearing on the subject before us. He writes:

“One conclusion was forced upon my mind at that time, and my impression of its truth has ever since remained unshaken. It is that our normal waking consciousness, rational consciousness as we call it, is but one special type of consciousness, whilst all about it, parted from it by the filmiest of screens, there lie potential forms of consciousness entirely different. We may go through life without suspecting their existence; but apply the requisite stimulus, and at a touch they are there in all their completeness, definite types of mentality which probably somewhere have their field of application and adaptation. No account of the Universe in its totality can be final which leaves these other forms of consciousness quite disregarded. How to regard them is the question, for they are so discontinuous with ordinary consciousness. Yet they may determine attitudes, though they cannot furnish formulas, and open a region, though they fail to give a map.”¹

Unless this testimony from one of the first psychologists of the age is to be brushed aside entirely as based on mere hallucination, it looks as if Professor James had come into some sort of contact with just such a realm of discarnate consciousnesses as we have been discussing.

Perhaps, too, there is something to be learnt from the tangled mass of legend and folk-lore which has come down to us from the past. The evidence from this source is vague and untested; it is overlaid with absurdities and superstitions, but it is massive. We find through it all a persistent tradition of the existence of beings—fairies, elves, pixies, *et hoc genus omne*—who may be broadly described as non-moral. Consciousnesses which are alert, but in a sphere which is strictly circumscribed; intelligent, but hardly rational; unstable as water, and governed wholly by the caprice of the moment; friendly or spiteful as the fancy seizes them, and with few interests beyond the limits of some narrow routine or function which they

¹ *Varieties of Religious Experience*, 388.

discharge mechanically. Outside this they live for the moment only. If they are happy, it is the irresponsible happiness of an unthinking creature. It is a revel of life with them, but nothing more; for they have no souls, though some of them yearn passionately to obtain one. Even in our own day we can trace the influence of this ancient tradition in the Nature-spirits which haunted Browning's fancy so vividly. Their way is not our way, but sometimes the paths may cross. Under the stress of some strong emotion, in the rendings of anguish, or in the exaltation of ecstasy, we may catch for a moment these powers at play. A passing *rapport* is established between us and them. For the time our lives run in unison with theirs. For just this fleeting interval the current of our being is swollen by an inpouring flood which joins it. But the two streams diverge once more, and we are left wondering at the might which possessed us, but has passed away. As Browning conceived them these shadowy powers care nothing for us. They neither love nor hate us: they have their own work to do. For a moment we may become attuned to them, and the great melody of their life may blend with ours while the conditions of this brief unison endure. But they soon dissolve, and we sink back into ourselves again, as the mysterious music dies away into silence. The powers have no need of us. They just relapse into their ancient mood. Wordsworth also tells us how he

Heard among the solitary hills
 Low breathings coming after me and sounds
 Of undistinguishable motion, steps
 Almost as silent as the turf they trod.

and speaks of

Huge and mighty forms, that do not live
 Like living man, moved slowly through the mind
 By day, and were a trouble to my dreams.

All this, no doubt, does not come to very much, and I claim for it no greater weight than it deserves. Science cannot be asked to accept the crude beliefs of unscientific ages. A poet's fancy is not to be taken too seriously. True

enough. But when the poet's fancy chimes in with the tradition, and both are corroborated by the experience of a psychologist, we have some reason for keeping an open mind on the subject; some reason for reflecting whether the tradition must needs be all error, whether the poet's fancy may not have been touched by revelation. But even if such evidence be discredited altogether, the picture which it has conjured up still remains; and the picture itself surely presents to us a possible phase of man in the making. Beings like these, conscious but not properly self-conscious, or endowed only with the "receptual" self-consciousness of Romanes (Chapter VIII.), non-moral, limited in function, and limited in volition, are very much what we should expect to find among the non-human consciousnesses from which self-conscious man has sprung. But here, for the present, these speculations must stop. What functions such consciousnesses may possess, how far they may be amenable to human control, or how far, on the other hand, man may be subjected to their influence—these are questions which must be left for the future to answer. That such consciousnesses actually exist has not been proved, but it has been shown to be probable. And if they do exist, James is certainly right in warning us that no account of the Universe can be final which leaves them disregarded.

And here let us pause for a moment to consider the light thrown by these possibilities on the character and constituents of the human soul. Regarding the soul as a mind-structure which has attained self-consciousness, we see now how long and laborious its journey has been, and we see also the immense variety of the constituents which must have entered into its composition. The process of its evolution would be somewhat as follows: As the physical organism appropriates from its material environment the necessary constituents of its physical growth, so the mind-structure which grows up with it will appropriate from the surrounding mind-stuff and mind-structures the constituents suitable to its mental growth. The mind-structure so formed will survive the death of the physical body to which it belonged, and—in the lower orders of life—will then

become liable to appropriation by higher mental organisms. This, however, is a possibility only for it, not a certainty. It may continue on its own plane, and function once more in a physical body similar to its last, or it may find scope for its activity in a discarnate condition. But sooner or later, if it is to rise to the level of a human self-consciousness, it must submit to appropriation. This is the inexorable condition of such an advance. As a mind-structure acquires increased complexity, and grows richer by the absorption of mind-structures lower in the scale, it becomes capable of higher functions and endowed with wider powers. Yet these by themselves will rarely enable it to rise far. Only by repeated incorporations in higher and higher mind-structures can it reach the heights of self-consciousness. For instance, the mind-structure of a dog might improve indefinitely on canine lines, but it could never develop by itself into a human soul. Such a possibility would be open only to mind-structures already high up on the direct line of human ascent. Mind-structures which are off this line can only get into it by the aid of repeated incorporations taking this direction. Of course, no incorporated mind-structure can itself become a complete human soul. It can only be a brick in the self-conscious edifice, a constituent part of a human soul.

A mind-structure which has once attained self-consciousness, and has thereby become a human soul, will not, on the view taken here, be liable to any further appropriation. So long, at any rate, as it remains human in character, it will have an independent career of its own. And here the value of its age long evolution becomes manifest. For in the course of the countless centuries which this evolution has occupied the soul will have incorporated within itself an immense diversity of component qualities. The ape and tiger are there, as we know full well, and myriads of lower mind-structures must also have gone to its making. It must embrace qualities from the amœba as well as those which may blossom into the poet or the sage. Innumerable forms of mental life are thus woven into its texture, and from this rich variety it draws its power of rapid dealing with, and ready adjustment to, the larger possibilities and

more varied conditions of its new realm of existence. From the same source there springs that infinite variety in individuals which distinguishes man from lower creatures. One animal is much like another of the same species, but the members of the human race are distinguished from each other by all the innumerable differences which give value and interest to the individual. Moreover, in these manifold and varied endowments of the soul we may find the explanation, not only of the distinction between different human beings, but also of those diverse manifestations of each single soul which constitute the distinction between the soul and the self.



CHAPTER XII

A QUESTION IN SOUL EVOLUTION

WE have now reached the point where the evolving soul has become distinctively human; but before attempting to follow its further career there is still a question to consider which affects the whole course and the whole mode of its evolution.

In dealing with the origin of life, which is also ultimately the origin of mind, it has been shown (Chapter VI.) that the appearance of each has perforce to await the appearance of a physical vehicle in which it can function. Thus, the evolution of mind is, from the very beginning, conditioned to some extent by that of the physical vehicles with which it is from time to time associated. Man has a bodily as well as a mental structure, and hence, in order to follow the evolution of the soul, we must get some idea of the lines followed by the evolution of the body. I do not pretend, of course, to deal with this vast subject exhaustively; nor, indeed, is it necessary, for it is only one of its problems which immediately concerns us.

Stated in the briefest possible manner, physical evolution proceeds (1) by the preservation of variations which are advantageous to the individual organism; (2) by hereditary transmission of these advantageous variations to posterity. For instance, in a species which is preyed upon by some other species, slight improvements, say, in speed, will enable the favoured individuals the better to escape their enemies, or in strength, the better to resist them, or in protective colouring, the better to evade them. When beneficial variations like these appear, Natural Selection begins to operate upon them, but the method of its operations must not be misunderstood. The process of Natural

Selection is negative rather than positive. It does not actively assist the superior individuals: it merely cuts off the individuals which are less beneficially endowed. Indeed, as Dr. Mercier remarks, *Natural Extermination* would be a more appropriate title for it. Its influence in the struggle for life is in no way formative: it simply tends to destroy certain lines of development.¹ The inferior individuals tend to fall easier victims to enemies or disease than those with a more fortunate endowment, who tend to survive; and, if these useful peculiarities are transmissible by heredity, they ultimately become the fixed property of the race. In this way it will advance from strength to strength. Each new favourable variation as it arises is handed on to the posterity of the individual possessing it, and the course of evolution is straightforward and clear. But if, on the other hand, beneficial variations are not transmitted by heredity, but perish with the individual, evolution must come to a deadlock. Natural selection, indeed, would continue to cut off, preferably, the individuals with no favourable variations; but as the better endowed individuals could not pass on their advantageous variations to the next generation, evolutionary progress must cease. Clearly, therefore, if evolution is to proceed at all, some variations, at any rate, must be transmissible by heredity; and the question at present dividing the scientific world is, Which?

Now, the existence of transmissible variations is indisputable, but how they *originate* is a very moot point. The question is too large to be discussed at any length, and it must suffice to mention shortly the principal explanations which are offered. By Weismann the origin of these variations has been finally referred to fluctuations in the food-supply of certain constituents of the germ-plasm which he calls "determinants," and which stand in a definite relation to particular cells or kinds of cells in the organism which is to be developed (see Chapter XIV.). These, it should be observed, are hypothetical constituents only, and though something of the kind may very likely exist, their existence has not been proved. De Vries

¹ *Contemporary Review*, December, 1908, p. 706.

and his school hold that transmissible variations can arise *per saltum* without any transitional links. Thus, while the current belief is that species have arisen slowly through the gradual accumulation by selection of small individual variations, De Vries supposes that new species and varieties may be produced from existing forms by sudden leaps, which he calls "Mutations." The appearance of Mutations is explained by Mendelians as being due to the presence of some definite factor in the fertilised ovum from which the organism sprang. This presence or absence takes place according to the complicated laws of the Mendelian theory, some of which are touched upon in Chapter XIX. On the other hand, the Adaptationists hold that variations which may become transmissible arise as a direct response of the organism to the external forces of its environment, a response which is made possible by the inherent variability or modifiability of the organism itself. The question yet remains to be decided, and Darwin might still repeat that "our ignorance of the laws of variation is profound." Variation has been described as a novel cell-division; "but," says Professor J. A. Thomson, "to tell what specific cause induces this novelty is still beyond our power."¹

Putting the matter, however, as broadly as possible, we may say that variations are produced in an individual organism either (1) by external, or (2) by internal influences. External influences comprise climate, food, accidents, and all the effects produced upon the individual by the general surroundings, or his own habits and activities. Under this head, therefore, will come the effects produced by the use or disuse of particular limbs or organs. The frequent and sustained use of a limb or organ strengthens and develops it; disuse weakens it until, in extreme cases, it disappears. So, too, constant practice of any art, employment, game, and so forth, usually confers on the individual some special muscular development or dexterity. Internal influences comprise those arising out of the qualities *inherited* from parents and remoter ancestry, qualities which have not been *acquired* by parent or ancestor, but belong to the parental or ancestral germ-plasm, which has come down to the

¹ *Heredity*, 102.

individual *through* his parents and ancestors. The germ-plasm, according to this view, though *in* the body, is not strictly *of* it. It has been transmitted from the past through the bodies of successive individuals, each of which has played the part of host to it. Now, confining our attention for the moment to the higher organisms—*i.e.*, those which are multicellular as opposed to those which are unicellular—Lamarck, Spencer, and other Evolutionists have considered that *both* kinds of variations, those due to external as well as those due to internal influences, could be transmitted hereditarily; in other words they considered that *acquired* variations *could* be so transmitted. Weismann and his followers contend, on the other hand, that there is no proof, and, indeed, little, if any, possibility of the transmission of acquired variations, and that only those due to internal influences—*i.e.*, germinal variations—can be hereditarily transmitted. Weismann gives the following explanation of acquired characters:

“By *acquired* characters I mean those which are not pre-formed in the germ, but which arise only through special influences affecting the body or individual parts of it. They are due to the reaction of these parts to any external influences apart from the necessary conditions for development. I have called them ‘somatogenic’ characters, because they are produced by the reaction of the body or soma, and I contrast them with the ‘blastogenic’ characters of an individual, or those which originate solely in the primary constituents of the germ.”

He adds:

“It is an inevitable consequence of the theory of the germ-plasm—that somatogenic variations are not transmissible, and that consequently every permanent variation proceeds from the germ, in which it must be represented by a modification of the primary constituents.”¹

Putting it in another way, the Weismannites consider that evolution is worked by means of Natural Selection *alone*. Internal influences, they say, will supply variations in sufficient numbers and diversity for Natural Selection to operate upon, and thus promote evolution by (indirectly) preserving such of these chance variations as are useful, and (directly) weeding out those which are detrimental.

¹ *The Germ-Plasm*, 392.

In calling these "chance" variations it is not meant that they are uncaused, but that their origins are too obscure to be traced. They spring from alterations in the constitution of the germinal substance brought about by interbreeding and other causes, but they are in no way related to any external influences. For instance, among the earliest ancestors of the horse a slightly more compact foot arose as a germinal variation—*i.e.*, some constituent causing it somehow got into the germ-plasm. This proved beneficial to the individuals possessing it in the struggle for existence, and was accordingly preserved by natural selection. But if a similar variation were to occur, say, in a tiger, it would probably be detrimental to the creature's chance survival, and would accordingly be suppressed by natural selection. The other school (whom I will call, for short, the Transmissionists), while recognising that *acquired* variations are much less heritable than germinal variations, consider that the former may be, and are, hereditarily transmitted in some cases, and to a certain extent, and thereby supply natural selection with an additional class of variations to work upon. Professor Dendy puts the point in a nutshell:

"We may at once agree with Weismann that blastogenic characters alone are transmitted from parent to offspring, but the real question is, Can a somatogenic character be converted into, or give rise to, a blastogenic one? In other words, Can a modification of the body or soma, arising in the lifetime of the individual and itself in no way due to inheritance, affect the germ-cells in such a way that the offspring developed from them will exhibit a corresponding modification of its soma?"¹

Observe that the Professor speaks of a *corresponding* modification of the soma. It is not necessary that the acquired character of the parent should be reproduced in a *precisely similar* form in the offspring. We need only claim the possibility of a parental acquirement appearing in some corresponding or related form in the offspring (see Chapter XV.).

The preponderance of opinion is at present with Weismann, but there are weighty authorities on the other side also, and of late the Weismannites have been obliged to

¹ *Outlines of Evolutionary Biology*, 176-7.

abandon some of their extreme pretensions. Their doctrine, as shown above, rests on Weismann's theory of the germ-plasm. An outline sketch of this is all that can be attempted here, but it may suffice for our present purpose.

Life in its simplest form is potentially immortal. The simple one-celled organisms, the Protozoa and Protophyta, may be killed by accident or external force, or perish from want of nutrition or severity of climate; but natural death, death from internal causes, is impossible to them. They multiply by fission or generation—*i.e.*, the cell divides into two halves or puts out a new bud. An Infusorian, for instance, "never lies down to die, but simply splits itself afresh into two halves which continue to live." The two halves into which the cell divides, or the bud which it puts forth, are but portions of the living material of the original cell. In this way the original cell, or at any rate the material composing it, continues to live, though in a divided condition; death lays no hand upon it. And, inasmuch as this process goes on from one generation to another, this living material never dies, though its total amount is perpetually being increased as new individuals spring out of it. Each of the countless individuals which thus arise is as old as the species itself, and each is potentially capable of living on indefinitely by means of division. But when we pass to the more elaborate many-celled organisms—the Metazoa and Metaphyta—more complex arrangements gradually appear. The body becomes divided into two sharply distinguished sets of cells, the somatic or body cells, and the reproductive or germ cells. Of these the reproductive cells alone retain the potential immortality of the one-celled organism. They perish, of course, with the death of the body which harbours them, or from other accidents, but in their own nature they are immortal.¹ The somatic cells multiply into similar cells for a considerable time, but they have lost the power of unlimited repro-

¹ Weismann ultimately came to the conclusion that it is only the nucleus of the germ-cell which contains germ-plasm, and is consequently immortal, the rest of the cell being merely nutritive, not formative. (*Essays*, i., 181; ii., 83). But his original view emphasises more clearly the distinction between unicellular and multicellular organisms, and I therefore retain it subject to this correction.

duction, and in due course they die. The one-celled organism can multiply by division indefinitely, but in the many-celled organisms the somatic cells can only multiply into a certain number of *similar* cells, while the germ-cells can, under proper conditions, reproduce *entire individuals*. The essential material of the reproductive cells is called by Weismann "germ-plasm," and in nearly all the multicellular organisms these cells are segregated from the somatic cells at a very early stage of the individual's development, and are kept apart from the general functions of the body, their task being the work of reproduction only. But since what they reproduce is an *entire* individual, it is obvious that they must contain constituents capable of producing the *somatic* cells as well as the reproductive cells of each new individual.

The greater complexity of the new arrangement necessitates an entirely new set of relations between the somatic and reproductive cells of the organism. The sum total of the somatic cells, which of course constitute its body, becomes a vehicle for the protection of the germ-plasm constituting the reproductive cells. These, as Dr. Archdall Reid observes, are "purely parasitic."¹ The body is thus a host for the germ-plasm which resides within it and derives protection and nutrition from it, but which is, nevertheless, "without significance for the life of the individual."² The body may acquire, during the life of the individual, special characteristics, useful or injurious. It may be developed into high efficiency by special culture. Its tissues and its organs may be modified or affected in various ways by the action of external circumstances, or by the individual's habits. But to all such variations, said Weismann, the germ-plasm, sheltered within it, is supremely indifferent. It retains its own inherent character and qualities unaltered by the acquirements of the body, and these inherent qualities it transmits, but these alone. The germ-plasm, therefore, is the substance which is essentially connected with the phenomena of heredity, and by means of which hereditary transmission is effected.

¹ *Principles of Heredity*, 3.

² Weismann, *Essays*, i., 73.

Concomitantly, however, with the segregation of the germ-cells a new mode of reproduction appeared. The simple division by which unicellular reproduction is effected gave way to the more complex method of sexual reproduction. We need not stop here to discuss the various explanations put forward to show how this change was brought about; but a simpler anticipation of it is to be seen in the "conjugation" of two independent organisms which is found among unicellular plants and animals (see Chapter XIX.). Sexual reproduction is effected by the union of two minute portions of the germ-plasms of the respective parents. Part of this blended germ-plasm goes to the formation of the body-cells of the offspring, but part is stored up *unaltered* in the germ-cells of this offspring, to be transmitted unaltered (according to Weismann) to the next generation.¹

One obvious result of sexual reproduction is that it furnishes a vastly wider range of congenital variations than was possible under the simple fission by which unicellular reproduction is effected; and consequently it offers a correspondingly wider field for the operations of natural selection. Each case of sexual fertilisation means the union of "two complex hereditary histories." The offspring presents a combination of the germ-plasms of its two parents, each of whom in turn represents a similar combination; so that in the tenth generation a single germ-plasm contains 1,024 different ancestral germ-plasms.²

¹ A simple illustration may make this clear. Suppose A and B to be male and female animals who mate together. Each will contain in its reproductive organs a germ-plasm of its own which has come down to it from a long ancestry and contains the constituents of various qualities. These, of course, are germinal qualities, and they follow the germ-plasm wherever it goes. C, the offspring of A and B, will be, germinally, a combination of the germ-plasms of A and B, and this combined germ-plasm will be C's own germ-plasm. Part of this will have been expended in producing C's body, but a portion will remain *unaltered* in C's reproductive organs, to be transmitted in like manner to C's offspring. Thus, according to Weismann, whatever qualities are contained in C's germ-plasm can be transmitted hereditarily, but no quality acquired by C during lifetime can be so transmitted.

² Weismann, *Essays*, i., 283.

And with regard to the wide possibilities of variation thereby opened,

“natural selection is ever waiting and watching for such combinations of germ-plasm as will give the resulting organisms the best possible chance in their struggle for existence; while, at the same time, it is remorselessly destroying all those combinations of germ-plasm which are handed over to the custody of organisms not so well fitted to their conditions of life.”¹

This infinite wealth of inborn variations amply suffices, according to Weismann, to provide the materials of evolution. Such variations alone can be transmitted, and any apparent transmission of acquirements must be otherwise explained. A famous cricketer, to take a simple instance, may have a cricketing son. But this following in the parental footsteps is not due to the cricketing acquirements of the father being transmitted to the son, but to the presence of a portion of the same germ-plasm in both. Some minute peculiarity in the ancestral germ-plasm facilitates the development of proficiency in cricket, and thus the proficiency of the father and of the son alike is derived from a common source—namely, the ancestral germ-plasm, in which each partakes.

Weismann's theory is, no doubt, expressly directed to *bodily* acquirements; but since mental and physical progress are inextricably associated in this world of ours, it obviously affects the evolution of the soul also. Let us briefly recall the view which has been taken of this evolution. We have supposed it to originate in a spiritual impulse upon mind-stuff, under which higher and higher mental organisms appear as they find physical vehicles of greater and greater complexity in which to function; we have seen reason to think that at a comparatively early stage in this advance the mind-structure may cohere as a mental organism after the disintegration of its physical vehicle (Chapter VIII.). By gradually ascending steps the self-conscious mind-structure of the human soul is evolved, and for this we may venture to predict a permanent existence. But how has this evolution been achieved? How has the splendid complex of the human soul been evolved

¹ Romanes, *Examination of Weismannism*, 22.

from the humble mind-structure which controls the atom ? Only, it must be admitted, by the aid of appropriate material structures. Superior to the matter in which it functions, yet to some extent conditioned by it, mind can only realise its own possibilities through those of its physical vehicles. Under the press of the spiritual impulse behind it, mind-stuff is ready enough to be moulded into mind-structures, but it must first find some physical structure in which it can take shape. In all the higher forms of life this physical structure is a brain. In this the mind-structure functions, by this its activities are conditioned and limited, and through this it acquires its complexity and coherence. Its acquirements are, in fact, derived from external influences—that is to say, from its particular experiences in the organism to which it belongs, and the particular configuration of the brain in which it works. But as the mind-structure can exist apart from any physical organism, so its course of evolution is not identical with that of matter. True, it finds in the physical organism its natural opportunities for improvement, but the acquisitions which it derives from these opportunities belong to itself. Were this not so, it is difficult to see how, if mind be distinct from matter, mental evolution could proceed at all. If mental phenomena be merely products of matter, it is easy enough to suppose that as the brain grows more complex it will display higher and more elaborate mental phenomena. Under these circumstances the mind and the brain perish together. On Weismann's theory, blastogenic physical improvements (improvements which spring from germinal sources) will be preserved and handed down to posterity by the continuous germ-plasm; but he has no correspondingly continuous soul-plasm wherein mental improvements may be preserved and transmitted. His theory does not need it, because for him the mind has no separate existence apart from the body. But for those who believe in such a separate existence mental continuity in some form is indispensable; and it must be admitted that it is exceedingly difficult to reconcile this mental continuity with Weismannism.

The difficulties are less obvious in the lower stages of

mental development, but they become insistent at the point which chiefly concerns us—the point where humanity is reached. And here they confront us in the form of the momentous question, How did some anthropoid develop into Man? By what means did any anthropoid mind-structure evolve into a human soul? We can understand that an individual anthropoid of superior intelligence might do something to improve the physical value of its own brain. Constant mental activity in such a case might possibly increase the size of the brain, and would certainly increase the intricacy of its grooves and sinuosities. But none of these *physical* improvements, these *physical acquirements*, would, according to Weismann, be transmitted to the animal's posterity. The animal's mind-structure (in the view taken here) would retain the corresponding *psychical* improvements produced by its own activity, but no improved brain to fit them would pass on to the next generation. Each succeeding generation would be endowed with exactly such brains, and no better, as their respective parental germ-plasms could provide. Consequently, the mind-structures of this species would be continually improving, while the brains in which they should function would remain comparatively stationary. I say comparatively, because in the course of sexual amphimixis some slightly better brains would appear, and these physical improvements, having a germinal origin, would also be transmissible. Such small improvements, however, would apparently be inadequate to meet the demands of the case. For, if every mind-structure retained its own *acquired* improvements, but the correspondingly *acquired* physical improvements in the brain died with the individual organism and only the germinal improvements were transmitted to posterity, it is obvious that the minds would ultimately outstrip the brains in development. The mind-structures thus developed might, no doubt, remain outside as discarnate consciousnesses, but their further development (on this earth) would be arrested for want of suitable bodily vehicles. Under the conditions then surrounding them—*i.e.*, the conditions just previous to the emergence of the human soul—the anthropoid mind-structure would be the

highest in existence, and therefore could not advance by incorporation into any higher mind-structure. Thus, the course of soul evolution might be seriously delayed.

So in the case of human beings, a father, or a mother, or both, by a life of intellectual activity, may make better brains for themselves, but they can impart none of this improvement to their children. These can only inherit brains of such size and complexity as are provided for by the blended germ-plasms of their father and mother, and such germ-plasms are (by the theory) altogether beyond the influence of any bodily acquirements of their respective possessors. Father and mother can endow their posterity with the germ-plasms which they have respectively received from their own parents, but they can do nothing to improve upon them. That important work must be left entirely to fortuitous combinations of germ-plasms and the operation of Natural Selection. The future evolution of the race is wholly committed to these two factors, and the materials for this evolution depend ultimately for their quality on the unfathomable impulses of sexual attachments. Nor is it possible, except within strict limits, to place any effective control upon these impulses. We ought, indeed, sternly to prohibit the propagation of the race by those who, either physically or mentally, are obviously unfit for the purpose; but, apart from such extreme cases, State interference with matrimony is neither possible nor to be desired. Out of this chaos fortunate combinations of germ-plasms—combinations with superior “survival values”—from time to time occur. These tend to endure and to transmit their superiority to future generations; while, under the pressure of Natural Selection, the inferior combinations die out. In this way, no doubt, a haphazard progress is made, but it is a progress, be it observed, in which the body must lag far behind the soul.

Lord Ernest Hamilton, from a somewhat different standpoint, regards this difficulty as being fatal to the possibility of a purely *terrestrial* development of the soul.

“We have, then, practical evidence of a psychical advance in actual progress; we have strong indications furnished by our psychical cravings that such advance will continue systematically;

we have the assurances of evolutionary history to the effect that physical and psychical advance is always *pari passu*, and, finally, we have irrefutable evidence that, while psychical advance on earth is *in esse* and *in posse*, physical advance is not. The conclusion is irresistible that the higher organisms with which that future psychical advance will be associated must be sought for in other spheres than this."¹

If Lord Ernest Hamilton's premises are correct, the conclusion is inevitable; and indeed, as above suggested, it is probable enough that the higher stages of soul evolution may take place elsewhere than on this earth. It is perhaps, however, too much to say that brain evolution has ceased altogether in mankind. It is sufficient to declare that if Weismann's theory be correct, there can be no increase in cerebral complexity adequate to meet the increasing demands of psychical evolution. Whether this evolution is continued elsewhere or not, it must, under such circumstances, certainly come to an end on the earth.

In like manner, under this theory, the influence of education is severely curtailed, seeing that its effects are strictly limited to the person who receives it. We can educate our children, and they may personally be improved thereby, but we can do nothing by education to improve the mental heritage of the stock. We may, by education, bring out the qualities which inhere in the individual's germ-plasm, but we cannot add any new ones. The Weismannites are fully alive to the importance of this question, which, as Professor Thomson says,

"should be of interest to the parent, the physician, the teacher, the moralist, and the social reformer—in short, to us all."²

Dr. Saleeby, who holds that the first task of scientific thought is to teach the public at large that acquired characters are not transmissible, states the case strongly:

"If the facts of heredity were what Darwin and Spencer supposed, [*i.e.*, that acquirements were transmissible], education would retain the unchallenged place which so many ages have given it, but it follows—and this point cannot be over-emphasised—from the modern discovery of the limitation of inheritance to the inherent or germinal that education must be replaced by selection as the supreme instrument of race progress."³

¹ *Involution*, 219.

² *Heredity*, 165.

³ *Health, Strength, and Happiness*, 415.

But though Weismannites recognise the difficulty, they do not effectively dispose of it. If the results of the father's education in no way affect the inherited nature of the offspring, education in each generation will practically have to begin afresh. Not so, it is answered, for civilised man enters upon an *external* heritage, so to speak, "of tradition and convention, custom and institution, law and literature, art and science."¹ All the culture of past ages has been preserved for the benefit of the new-born babe, and constitutes an atmosphere in which he will live and breathe from the cradle to the grave. In this environment he will find an *intellectual and moral* transmission of the mental acquirements of the past: a massive body of influences which represents the acquirements of the whole race, and consequently far outweighs in importance and power any acquirements which could be transmitted to him from his own particular ancestry. From this environment will be supplied a host of valuable stimuli serving to bring out to the full all the possibilities, mental and bodily, of the organism which he has actually inherited from his progenitors.

All this may be true, but it hardly touches the heart of the question, and the real difficulty remains practically unrelieved. In the first place, this intellectual and moral transmission cannot properly be described as a "heritage" at all, and the use of such a word in a discussion dealing with actual heredity is peculiarly misleading. It is as distinct from a true heritage as the gift of an estate by one man to another is distinct from the inheritance of an estate by the heir from his ancestor. In the latter case, if things are allowed to take their natural course, the estate must come to the heir. In the former case the acquisition of the estate is purely fortuitous; it may take place or it may not. The result of the two processes may be the same for the man who gets the estate, but the processes themselves are entirely different. Similarly—without pushing the comparison too far—the traditions and so forth of the society into which the child is born may, roughly, bring about the same results in him as a truly inherited culture would have brought about, but they are not inherited in any legitimate

¹ Thomson, *Heredity*, 165.

sense of the term. They represent nurture, not nature; their effect is purely educational, and consequently, on Weismannite principles, they can only affect the individual, not the stock. Moreover, their influence on the individual is at best precarious. He may be forced to leave the society, or the society itself may be broken up. In either case the influence of these traditions, etc., will diminish or entirely disappear; but he will carry his germinally inherited qualities with him everywhere, if he roams the earth from pole to pole. Moreover, the deliberate aim of education is improvement of the individual; and if social tradition is put forward as an adequate substitute for the inherited effects of education, it must be on the assumption that such tradition constantly and invariably makes for individual improvement—an assumption manifestly contrary to facts. Indeed, it is quite easy to exaggerate the educational effects of tradition. They can hardly be powerful influences for *improvement* in any but civilised communities, and among the lower animals they must be comparatively weak. But these influences—be their power great or small—are in no genuine sense a heritage. On the one hand they do not spring from the germ-plasm; on the other, they leave it untouched. Consequently, though education may help to educe the possibilities of an individual character here, it can do nothing, on this theory, to help its career hereafter. It can call to its aid the social traditions of the day, but it is as powerless as they are to prepare the way for any permanent advance in character, and, without such an advance, soul evolution is impossible. The advance may be effected by some other means, but neither education nor tradition can effect it.

These objections, grave as they are, do not, of course, justify us in asserting the transmission of bodily acquirements, but they do justify a close scrutiny of the theory which denies it. And perhaps after examination that theory will not prove so formidable as at first it appears.

CHAPTER XIII

EXAMINATION OF WEISMANNISM

THE difficulty immediately before us, as we saw in the last chapter, is that unless bodily acquirements can, to some extent at any rate, be transmitted to posterity, brain evolution could hardly keep pace with mental evolution. Let us therefore look a little more closely into the theory which denies this transmission.

Professor Weismann, who is far more temperate and reasonable than some of his supporters, has modified his views so often that it is not easy to give a distinct and correct account of them. His original opinion shall therefore be given as far as possible in his own words. The central idea of his theory is that heredity is brought about by the transference, from one generation to another, "of a substance with a definite chemical and, above all, molecular constitution."¹

"I believe that heredity depends upon the fact that a small portion of the effective substance of the germ, the germ-plasm, remains unchanged during the development of the ovum into an organism, and that this part of the germ-plasm serves as a foundation from which the germ-cells of the new organisms are produced. There is therefore continuity of the germ-plasm from one generation to another.² Hence it follows that the transmission of acquired properties is an impossibility, for if the germ-plasm is not formed anew in each individual, but is derived from that which precoded it, its structure and, above all, its molecular constitution, cannot depend upon the individual in which it happens to occur; but such an individual only forms, as it were, the nutritive soil at the expense of which the germ-plasm grows, while the latter possessed its char-

¹ *Essays*, i., 170.

² So, too, "I believe the substance of the germ-cells, the germ-plasm, has remained in perpetual continuity since the first origin of life" (*Essays*, i., 105).

acteristic structure from the beginning, viz. before the commencement of growth. But the tendencies of heredity, of which the germ-plasm is the bearer, depend upon this very molecular structure, and hence only those characters can be transmitted through successive generations *which have been previously inherited, viz. those characters which were potentially contained in the structure of the germ-plasm.* (The italics are mine.) It also follows that those other characters which have been acquired by the influence of special external conditions, during the lifetime of the parent, cannot be transmitted at all."¹

Consequently, though the body-cells and the body which, in the aggregate, they compose may be modified in various ways, either by the direct operation of external influences or by the habits formed by the individual, none of these modifications, however beneficial they may be, can be transmitted to the individual's posterity.

"The pianist . . . may by practice develope the muscles of his fingers so as to ensure the highest dexterity and power; but such an effect would be entirely transient, for it depends upon a modification in local nutrition which would be unable to cause any change in the molecular structure of the germ-cells, and could not therefore produce any effect upon the offspring."²

Heritable variations in multicellular organisms were, as we have seen, at one time ascribed by Weismann chiefly, if not entirely, to the blending of different germ-plasms by sexual amphimixis.³ This conclusion has been widely doubted, and, indeed, it was practically abandoned by Weismann himself in 1890;⁴ but in any case the question still remains, How did the first variations in germ-plasm originally arise? How did one germ-plasm in a species ever come to differ from another? For the theory assumes "the existence of a first generation, of which the individuals were already characterised by individual differences."⁵ To this Weismann answered first (in 1883) that he believed that all permanent hereditary variations could

be referred to the various external influences to which the germ is exposed before the commencement of embryonic development. . . . For the germ-cells are contained in the organism, and the external influences which affect them are intimately connected with the state of the organism in which they lie hid. If it be well

¹ *Essays*, i., 273.

² *Essays*, i., 285.

³ *Essays*, i., 279.

⁴ See *Essays*, ii., 94.

⁵ *Essays*, i., 284.

nourished, the germ-cells will have abundant nutriment; and, conversely, if it be weak and sickly, the germ-cells will be arrested in their growth. It is even possible that the effect of these influences may be more specialised; that is to say, they may act only upon *certain parts of the germ-cells.*"¹ (The italics are mine.)

This is obviously an admission that external influences may, to a certain extent at any rate, modify the germ-cells in multicellular organisms, not only generally, but specifically.

In 1886, however, he says:

"The origin of hereditary individual variability cannot, indeed, be found in the higher organisms—the Metazoa and Metaphyta; but it is to be sought for in the lowest—the unicellular organisms. In these latter the distinction between body-cell and germ-cell does not exist. Such organisms are reproduced by division, and if, therefore, any one of them becomes changed in the course of its life by some external influence, and thus receives an individual character, the method of reproduction ensures that the acquired peculiarity will be transmitted to its descendants."²

This account, therefore, confines the effects of external influences to unicellular organisms. And in 1891 he still further restricted the scope of these influences.

"My earlier views on unicellular organisms as the source of individual differences, in the sense that each change called forth in them by external influences, or by use and disuse, was supposed to be hereditary, must therefore be dismissed to some stage less distant from the origin of life. I now believe that such reactions under external influences can only obtain in the lowest organisms which are without any distinction between nucleus and cell-body. All variations which have arisen in them, by the operation of any causes whatever, must be inherited, and their hereditary individual variability is due to the direct influence of the external world."³

The power of external influences, therefore, to produce heritable variations is by this last account confined to the non-nucleated organisms, called by Haeckel *monera*. But this alteration of view leaves untouched the principle that all the heritable variations which *now* exist in germ-plasm were *originally* due to the action of external influences upon it in an earlier stage of its existence—*i.e.*, were acquired. In fact, as he expressed it (in 1886):

¹ *Essays*, i., 105.

² *Essays*, i., 284-5.

³ *Essays*, ii., 193.

"We are thus driven to the conclusion that the ultimate origin of hereditary individual differences lies in the direct action of external influences upon the organism."¹

Or more shortly (in 1904):

"The roots of all the transformations of organisms, then, lie in changes of external conditions."²

These fluctuations of opinion on Weismann's part contrast strangely with the confident assertiveness of some of his followers; and in any case they amount to a definite abandonment of the idea that the germ-plasm is absolutely out of reach of external influences. On the contrary, it now appears that external influences are the original causes of individual variations of germ-plasm.

External influences, however, can only produce transmissible variations in the lowest forms of unicellular organisms, and such influences cannot, according to Weismann, affect the germ-plasm of a multicellular organism.

The Weismannite belief in this immunity of the germ-plasm in multicellular organisms from external influences is, of course, essential to the doctrine of the non-transmission of their acquirements; and it rests chiefly on the supposition that, in these organisms, the germ-cells are segregated in an isolation which external influences cannot penetrate. But critics immediately pointed out that as a matter of fact such absolute isolation does not exist. The germ-plasm, like any other living thing, cannot fail to have some relations with its environment, and, in point of fact, if its immediate environment—namely, the body which acts as its host—should die, the germ-plasm perishes with it. The blood and the lymph of the body circulate through it, and any soluble poisons which the blood-stream may contain are thus brought into intimate contact with the germ-plasm. Moreover, the internal secretions of the body produced by such glands as the thyroid or suprarenal glands pass into the blood, and must affect the germ-plasm in common with the rest of the body.³ Indeed, as Mr. Tredgold puts it,

¹ *Essays*, i., 286.

² *Evolution Theory*, ii., 380.

³ Saleeby, *Heredity*, 74-77.

"It is inconceivable that the germ-plasm should lead a charmed life utterly uninfluenced by the nature of the fluids in which it is bathed, and upon which it depends for its sustenance."¹

Again, the reproductive glands are subject to nervous influences whereby the germ-plasm may be brought into relation with any part of the body. Moreover, it is found, as a matter of fact, that the germ-plasm is not so isolated as Weismann supposed. For plants of various kinds can be successfully propagated from single leaves, thus proving that germ-plasm must be present in these leaves. For instance, it is easy to grow new plants from Begonia leaves which have been cut off and laid upon moist sand.² Sach declares that

"in the true mosses almost any cell of the roots, leaves, and shoot-axes, and even of the immature sporogonium, may grow out under favourable conditions, become rooted, form new shoots, and give rise to an independent living plant."³

Romanes states that he was informed by the Rev. George Henslow that *any* plant will reproduce itself by its leaves under proper conditions.⁴ A similar result may be obtained even from chopped-off fragments of many invertebrate animals, such as anemones.⁵ All the phenomena, too, of regeneration point to the same conclusion. Crabs and lobsters can replace a lost claw; certain lizards can restore a broken tail; an entire new foot will grow out of the amputated stump of a newt's leg.⁶ Worms cut into pieces have a high regenerative capacity.⁷ Even the scar which forms on a flesh wound in man is an effort in the same direction.⁸ All these cases point to the presence of germ-plasm in the body-cells.

Speaking generally, there is more evidence of the transmission of acquirements in the vegetable than in the animal kingdom. To take the lowest forms: Bacteria, which are usually considered to be nearer plants than

¹ *Quarterly Review*, October, 1913, p. 377.

² Weismann, *Essays*, i., 215.

³ Quoted Weismann, *Essays*, i., 216.

⁴ *Examination of Weismann*, 53 note.

⁵ *Ib.*, 35, 51.

⁶ Weismann, *Evolution Theory*, ii., 20.

⁷ *Ib.*, 13.

⁸ *Ib.*, 33.

animals, undoubtedly acquire, under certain circumstances, increased toxic powers from their environment, which powers they transmit to their descendants;¹ though here, of course, we are dealing with unicellular organisms. Moreover, plants do not display the sharp division between germ-cells and body-cells displayed by animals. The case of the *Begonia* leaf, for instance, shows that here, at least, germ-plasm must be diffused through the body-cells of the plant. Hertwig, accordingly, considers that every cell of the body contains the germinal material for every part, and under appropriate conditions can act as a germ-cell. Weismann himself admits that in plants, unlike animals, the germ-cells do not appear till the end of the plant's development. Further, with regard to the transmission by plants of characters acquired from their environment, Henslow points out that, though no germ-cells or sperm-cells are in existence in plants when the environment acts upon their roots, stems, or leaves, nevertheless the effects are hereditary.² It was chiefly also on botanical grounds that Mr. Francis Darwin, in his Presidential Address to the British Association (September 2, 1908), was inclined to

"deny the distinction between germ and soma, to insist on the plain fact that the soma is continuous with the germ-cell, and that the somatic cells may have the same reproductive qualities as the germ-cells (as is proved by the facts of regeneration); that, in fact, the germ-cell is merely a specialized somatic cell, and has the essential qualities of the soma."

It seems clear, then, that, in certain cases at any rate, the germ-plasm is not confined to the germ-cells, but is diffused more or less through the entire organism. Weismann is obliged to admit this, and can only attempt (very feebly as it seems to me) to minimise its importance. For instance, he writes:

"I think that this fact only proves that in *Begonia* and similar plants all the cells of the leaves, or perhaps only certain germ-cells, contain a small amount of germ-plasm."³

But in the case of mosses quoted by Sach he owns that "we have here a case which requires the assumption that

¹ Saleeby, *Heredity*, 83.

² *Heredity of Acquirements in Plants*, 6.

³ *Essays*, i., 215.

all or nearly all cells must contain germ-plasm."¹ Such germ-plasm, however, he regards as merely "accessory," and normally inactive, only being roused to activity by the influence of external conditions on the cell.²

Similarly, with regard to regeneration, he confesses that he is unable to explain it; but he admits that it involves the supposition of germ-plasm being present in certain somatic cells at any rate, and he considers that the process itself is a surviving relic of the power of multiplication by division which is found in the unicellular organisms.³

Obviously, therefore, his theory of the *complete* isolation of the germ-cells in multicellulars falls to pieces: and, as we have seen, he has been obliged to modify considerably his original views as to the immunity of the germ-plasm from external influences. Nevertheless, he still denies the transmissibility of acquirements, chiefly on the following grounds: (1) That

"it has never been proved that acquired characters are transmitted and it has never been demonstrated that, without the aid of such transmission, the evolution of the organic world becomes unintelligible."⁴

(2) That it is impossible to conceive any means whereby such transmission could be effected.

"When we try to conceive how experiences and their consequences can be entailed, how new acquirements of the 'personal part' can have representative effects on the germinal part, we find ourselves confronted with almost, if not entirely, insuperable difficulties."⁵

With regard to the first objection, it is admittedly almost impossible to prove a negative, and, moreover, the position taken up by the Weismannites is a little unreasonable. They insist that no case shall be received as any sort of evidence in favour of the transmission of an acquirement, if by any possibility it can be explained (however tortuously) as a germinal transmission. Many such cases are much more easily explicable as transmitted acquirements than otherwise; but, as Dr. Mercier observes:

"Whenever we bring forward instances, that seem to us clear and convincing, we are met by the argument that these characters, which are certainly transmitted, and which appeared to have been

¹ *Essays*, i., 216.

² *Evolution Theory*, i., 383; ii., 34.

³ *Ib.*, ii., 35-6.

⁴ *Essays*, i., 81.

⁵ *Evolution Theory*, ii., 107.

acquired in the lifetime of the parent, were not really acquired, or they would not have been transmitted."¹

This vicious form of circular argument appears constantly in Weismann's writings, and it rests on the illegitimate assumption that his opponents accept the very theory which they are opposing.

Moreover, the value of the Weismannite theory is seriously affected by the grotesque improbabilities to which it often leads. According to it the only variations which can be transmitted in multicellular organisms are those which arise from the germ-plasm. They may *happen to be favourably adapted* to the surroundings of the individual, but these surroundings have *nothing whatever to do with forming them*. Eyes and ears, for instance, are developed without any relation to the effect of light or sound waves. When the first variation in the direction of eye or ear appeared, Natural Selection operated to preserve it; but, according to Weismannism, the same variation would have appeared if there had been no waves of light or sound. On this view, since the conditions of life never (in multicellulars) produce hereditary variations,

"No modification which is hereditary can have any essential or necessary relation to the requirements of life,"

and

"the fitness of a structure or structural mechanism for its purpose is thus originally accidental."

For example,

"the long legs of wading birds are suitable for their habit of wading, but the habit of wading [according to Weismannism] did not make the legs. Some individuals had longer legs than others, and those which had the longest survived, because the length of their legs enabled them to wade."²

Similarly:

"The thick fur of the Arctic mammals is assuredly not a direct effect of the cold, although it has developed in all Arctic animals; not only in the modern polar bears, foxes, and hares of the polar regions, but also in the shaggy-haired mammoth of diluvial Siberia, whose tropical relatives of to-day, the elephants, have an almost naked skin."³

¹ "The Transmission of Acquired Characters," *Contemporary Review*, December, 1908, p. 706.

² Cunningham, *Sexual Dimorphism*, 13.

³ *Evolution Theory*, ii., 269.

It is just a variation which happened to occur, and, having a survival value for the animal, was preserved.

Take, again, the still more remarkable case of the *Anableps tetropthalmus*. This is a fish, found in the rivers of Guiana, which has a habit of swimming with its eyes partly out of water. Curiously enough, the eyes of the fish are divided into an upper and lower portion, like the glasses of some spectacles. The outer covering or cornea is crossed by a dark band, and the inner iris is similarly divided, so that there are really two pupils instead of one. But the Weismannites are driven by their theory to declare that the fish's peculiar method of swimming had nothing to do with producing this remarkable arrangement. It was merely, they say, a chance variation which was seized upon and perpetuated by Natural Selection. But if it is a chance variation, why has it not occurred elsewhere, among animals, birds, or men? It would not have been *perpetuated* among these, no doubt, but in men at least it would have been *observed*. Yet naturalists tell us that the case of the *Anableps* is unique. Strange, is it not, that this *chance variation* should have happened to occur in the one instance where its surroundings make it useful and nowhere else? Stranger still, perhaps, that men of eminent learning and ability should cling to such a fantastic conclusion sooner than abate one tittle of their pet theory. Surely it is far more reasonable to regard this peculiarity of the *Anableps* as an adaptive modification *produced* by its special habit and transmitted hereditarily. Cunningham sums up the matter thus:

"A special adaptation necessarily implies special habits and special stimulations. These must produce, at least in the individual, corresponding modifications of structure. The peculiarities of special adaptations are generally of the same kind as the modifications which would result from the direct action of the special conditions. The natural conclusion is that the peculiarities in question are the effects of the special conditions accumulated by heredity. The only reason for rejecting this conclusion is the belief that the direct effects of conditions are not inherited. But this is only a belief, not an established truth."¹

¹ *Sexual Dimorphism*, 14-5.

As another instance of the transmission of an acquired quality, Dr. Mercier propounds the habit of the domesticated dog of turning round several times before lying down. This, he says,

"is certainly transmitted from parent to offspring, and has been so transmitted through many generations. Is this an acquired character, or does it originate in a spontaneous variation of the germ-plasm? Everyone admits that it was in its origin directly purposive, and was directed to trampling down the long grass to make a more comfortable bed. . . . Since the habit is unquestionably transmitted, those who deny the transmission of acquired characters must assume that in the germ-plasm of the first dog in whom the habit appeared there was such a fortuitous variation that when this germ developed into an adult animal it spontaneously exhibited, for the first time in canine history, the action of turning round in the grass before it lay down; and that this variation in the germ-plasm occurred without any reference to the existence of long grass in the habitat of the then existing dogs. It would equally have occurred if they had lived in a desert, or in the Arctic circle, or anywhere where there is no long herbage. In fact, however, by one of those happy accidents to which the germ-plasm is so prone, it happened to occur in the germ-plasm of an animal that lived, or at least slept, in long herbage. This habit of turning round and making a comfortable bed was so important to the life-worthiness of the dog that every dog whose germ-plasm was not so modified as to produce the habit was exterminated to a dog, and those only were left who were properly modified. None acquired it by imitation of others, for if it had been acquired by imitation it would have been an acquired quality, and could not have been transmitted. None acquired it by accidental experience of the greater comfort of a bed so made. None acquired it because the untrampled beds prevented them from coiling themselves up as dogs love to do when they go to sleep. The only possible way it could have been acquired was, since it is a transmissible quality, by variation of the germ-plasm *ad hoc*. . . . We, who believe that acquired qualities may be transmitted, hold that primæval dogs found that, if they turned round before lying down, they lay more comfortably; that in this way they acquired a habit of turning round before lying down; and that, as successive generations of dogs acquired this practice, partly from imitation, partly from intelligence, partly from experience, the habit began to be transmitted to their offspring, and at last became so fixed in the race that it still persists, though almost all occasion for its use has passed away."¹

The above is a good instance of a transmission which can easily and obviously be explained as the transmission

¹ "The Transmission of Acquired Characters," *Contemporary Review*, December, 1908, pp. 709, 710.

of an acquirement, but can hardly be explained at all on the Weismannite theory. For, according to this, the habit must have been due to a variation appearing in the germ-plasm which was subsequently preserved by Natural Selection. But why should Natural Selection preserve it? Its value as a help to the survival of the animal must be *nil*, or, at the best, negligible. It might originally have done something to promote the comfort of the individual, but it cannot have appreciably increased his chances of *survival*, and it is with *this alone* that Natural Selection is concerned. It deals with necessities, not with luxuries, and the only issue which it contemplates is life or death. It does not stoop to meddle with trifling variations, but only with such as decisively aid or hinder the individual in the struggle for existence. Consequently, variations in the germ-plasm which never attain selection-value tend to die out without becoming a constant character of the species.¹ The turning-round habit of the modern dog must therefore be traced to some other origin; and the only reasonable explanation of this habit—so deeply embedded in the animal's nature as to persist after its original object has practically disappeared—is that it is an acquirement of the primæval dog which has been hereditarily transmitted to its modern descendants.

Yet again, Herbert Spencer's famous argument for the transmission of acquirements, based on the coadaptation of co-operative parts, has never been really answered. Weismann states it thus:

"He [Spencer] pointed out that many, if not, indeed, most, modifications of bodily parts, to be effective, implied further changes, often very numerous, in other parts, and these latter must therefore have changed *simultaneously* with the part which was being changed under the control of natural selection; this, however, is only conceivable as due to an inheritance of the changes caused by use, since a simultaneous alteration of so many parts through natural selection would be impossible. If, for instance, the antlers of our modern stag were to grow to the size of those of the Giant Stag of the Irish peat-bogs, which measured over ten feet from tip to tip, this would mean—as has already been shown—a simultaneous thickening of the skull, and, to bear the heavy burden, a strength-

¹ *Evolution Theory*, ii., 266.

ening of the *ligamentum nuchæ*, of the muscles of the neck and back, of the bones of the legs and their muscles, and, finally, of all the nerves supplying the muscles; and how could all this happen simultaneously with, and in exact proportion to, the growth of the antlers, if it depended—as natural selection assumes—on chance variations of all these parts? What if the appropriately favourable variation in one of these organs did not occur? A harmonious variation of all the parts—bones, muscles, nerves, ligaments—which unite in a common activity, is an inadmissible assumption, because, in many cases, such co-operating groups of organs have in the course of evolution developed in opposite directions. In the giraffe, for instance, the fore-legs are longer than the hind-legs, which is the reverse of what obtains in the majority of ruminants; in the kangaroo the hind-legs, on the contrary, have developed to a disproportionate size, while the fore-legs have degenerated into relatively small grasping arms. Co-operating parts, like the fore and hind limbs, may thus follow opposite paths of evolution; their variations need not always be directed to the same end.”¹

Weismann admits that “the difficulty presented by these so-called coadaptations or harmonious correlations cannot be denied”; and also that many such cases could be easily explained by the transmission of acquirements.

“But” (he adds), “there are whole series of facts, or rather of groups of facts, which prove that the causes of co-adaptation do not lie in the inheritance of functional modifications, and this must be recognized, even though we may not yet be in a position to state the causes of co-adaptation, and to say whether natural selection suffices to explain it or not.”² (The italics are mine.)

The arguments by which he attempts to show (quite inconclusively as it appears to me) that Spencer’s view is incorrect are too lengthy to be discussed here; but he is quite unable to offer any satisfactory explanation of his own. Subsequently,³ but I think without success, he attempts to explain the numerous necessary adaptations as the result of sexual amphimixis. Moreover, if, as the above quotation shows, he contemplates the possibility of Natural Selection being inadequate to explain the facts, he has nothing else to fall back upon. For his whole theory is essentially mechanical, and he expressly excludes the idea of any transforming force within the organism,⁴ or of any “purposive forces” behind it.⁵

¹ *Evolution Theory*, ii., 80-1.

² *Ib.*, ii., 81.

³ *Ib.*, 196-7.

⁴ *Essays*, i., 76, 263-4.

⁵ *Evolution Theory*, ii., 391.

Professor Thomson also admits "that coadaptations are difficult to account for in terms of the ordinary selection formula";¹ but though he puts forward some tentative suggestions, he, too, has no substantial alternative explanation to offer.

Dr. Archdall Reid seeks a way out of the difficulty by referring these coadaptations to the transmission, not of an *acquirement*, but of a *power*. His view, if I rightly understand it, is that certain bodily structures and organs, such as hair, nose, eyes, ears, teeth, nails, sexual organs, etc., "are wholly inborn, and apparently do not owe their development in the least to use and exercise"; but that the limbs and certain other organs, though of course inborn, cannot attain their due development without use and exercise.² They owe their *origin* to the germ-plasm, but their *development* to something external to it. This development, therefore, being a bodily acquirement which cannot be transmitted, has to be attained afresh by each individual of the race. The development of the father's arm is not transmitted to the arm of his son; but what is transmitted is, not the acquirement, but the power of making it.

"Plainly, then, that which is transmitted to the infant is not the modification, but only the power of acquiring the modification under similar circumstances. . . . It follows, therefore, that the exquisite co-ordination of all the parts of a high animal is not due to the inherited effects of use and disuse, but to this great power of acquiring use-modifications along certain definite lines; so that if an animal varies in such a way as to have one of its structures (*e.g.*, horn, which is wholly inborn) larger than it was in the parent, then all the other structures associated with it, owing to the increased strain (*i.e.*, the increased stimulation) put on them, undergo a corresponding modification, and thus preserve the harmony of all the parts of the whole."³

Some of Dr. Reid's propositions seem to me highly disputable, and I am tempted to wonder whether he has really thought out his own theory. He supposes a germinal variation which will give an animal, quite apart from any developing activity, a larger horn than its parent's. This

¹ *Heredity*, 237.

² *Principles of Heredity*, 35.

³ *Ib.*, 35.

larger horn is wholly inborn—that is to say, wholly germinal—and therefore can be transmitted, but the corresponding modification of the associated structures is an acquirement, and therefore cannot be transmitted. True, replies Dr. Reid; but, though the modification itself is an acquirement, the power of making it is germinal. This power seems to be identical with Sir E. Ray Lankester's "educability" of the organism.

"The character which we describe as 'educability' can be transmitted; it is a congenital character. But the *results* of education can *not* be transmitted. In each generation they have to be acquired afresh. With increased 'educability' they are more readily acquired, and a larger variety of them."¹

Now, in the case before us of the evolution of a constantly increasing horn, it is clear that a corresponding increase of educability will be required. But where is this *increased* educability, this larger power of making modifications, to come from? It is said to be germinal—that is to say, a quality of the germ-plasm; but how is the germ-plasm to go on spontaneously increasing its educability, off its own bat, so to speak? The educability of a particular individual can be increased, no doubt, by appropriate stimuli, but *this* increase is an acquirement, and therefore, according to our friends, cannot be transmitted.

Moreover, this explanation is open to another and equally serious objection. The modifiability of protoplasm may be readily admitted, and this, no doubt, is a germinal quality; but obviously it cannot be modified indefinitely.²

Granting that animals have the power, not only of developing, but of increasing their muscular efficiency by use and exercise, it is clear that this power is subject to strict limitations. Under a more than normal amount of exercise a muscle may acquire a more than ordinary efficiency, but there are obvious limits to the possibility of this development. No amount of exercise could, for instance, give a man strength enough to lift a ton weight with one hand. Muscle and muscular strength cannot, in fact, be artificially developed beyond a certain point; and,

¹ *Kingdom of Man*, 123.

² Weismann, *Evolution Theory*, ii., 347.

on Dr. Reid's theory, any such *acquired* development would perish with the individual, and only such muscles as are normal to the individual's germ-plasm, with a *similarly normal power of development*, would be transmitted to the progeny. Let us now apply these considerations to Weismann's case of the evolution of the Giant Elk from some smaller form of deer. Let us take the antlers of the Giant Elk as equivalent (say) to 20, the antlers of the smaller deer as equivalent to 10, and the normal efficiency of its associated muscles, etc., as equivalent to 10, with a power of development limited to 15. The particular numbers do not matter, provided that they are consistent with the obvious fact that the smaller deer does not possess in the first instance a power of developing its muscular efficiency up to the level of the Giant Elk. Such a power, on the Weismannite view, could only be acquired in the course of ages by repeated combinations of suitable germ-plasms under sexual amphimixis. Now, the first step in the evolution would be the appearance of some animal with slightly larger antlers, equivalent (say) to 11. This would put an increased strain upon the associated muscles, but they could meet it, and their efficiency under the strain would develop to 11. The larger antlers being, *ex hypothesi*, a beneficial modification with a selection-value, would tend to survive, and by degrees animals with larger and larger antlers would appear. Now, the associated muscles could bear this increase up to antlers equivalent to 15, but no farther. For only the *normal* power of development is transmitted from one generation to another, and this power stops at 15. Moreover, since it is a property of the germ-plasm, it cannot, on Dr. Reid's theory, be increased or in any way affected by the bodily development of any individual in which it resides. Therefore, when, in the course of evolution, the antlers exceeded an equivalent of 15, the associated muscles would not bear the strain, and such antlers would become, not a cause of survival, but of elimination. An animal endowed with them would be like a child turned out to shift for itself with its hands tied to a battle-axe. Evolution on these lines would be manifestly impossible, and Dr. Reid's explanation, therefore, must be deemed unsatisfactory.

CHAPTER XIV

EXAMINATION OF WEISMANNISM (*continued*)

THERE are certain other cases of apparently transmitted acquirements which can only be briefly referred to. The degeneration of the little toe is a character originally acquired, but which has now become hereditary.

“It is due to bipedal walking, which, in order to balance the body, develops most exclusively the inner side of the foot.”¹

The thickened skin on the soles of the feet of even unborn infants looks very like an inherited effect of pressure during long generations. As to this Professor J. A. Thomson remarks that

“a variation in the direction of thickened solar epidermis might have selection-value from very early days, to the arboreal ape as well as to the bootless man.”²

It is just possible, no doubt, but that is all which can be said for this explanation.

Dr. Bastian quotes another instance given by Dr. Havelock Charles:

“Dr. Havelock Charles has also made known more than twenty differences, chiefly in the structure of the knee and ankle joints, to be met with between the leg-bones of Europeans and those of the Punjaub people—‘differences caused by their respective habits of sitting in chairs and squatting on the ground.’ Markings and facets possessed by the latter and transmitted by heredity (since they are to be found in the new-born infant and even in the foetus) are present owing to their habit, uniformly persisted in through innumerable generations, of squatting; while there is a total disappearance of the markings in question in the skeleton of the European.”³

¹ Delage and Goldsmith, *Theories of Evolution*, 205.

² *Heredity*, 211.

³ *Nature and Origin of Living Matter*, 127.

Surely this shows

“that the response of the bone and joints to the demands made by the habits of life has been transmitted, so that it appears in the individual at an early stage.”¹

Professor Thomson feels the difficulty of this case (with the facts of which, however, he is not, as his criticism shows, fully acquainted), and admits that it is a line of inquiry which deserves to be followed up. Meanwhile he can only suggest² that these peculiarities of structure “may be adaptations originating in germinal variations.” In that case he would be driven to maintain not only that these adaptations arose *altogether independently of the national habit of squatting* which they favoured, but also that they were of such importance to the survival of the race that they were preserved by Natural Selection.

In the case of plants it seems impossible to deny that characters acquired under the influence of surrounding conditions may be transmitted hereditarily; but, as plants have no nervous system, it may be contended that conclusions drawn from them do not apply to animals. Nevertheless, the experiments of Pictet and Fisher on butterflies, of Cunningham on flatfish, of Kammerer on salamanders, and many others, show, at the very least, a strong probability that the effects of heat, cold, light, and the environment generally, may be hereditarily transmitted in animals.

Weismann, dealing with Darwin's views that certain cases of the transference of male characters to females are due to inheritance, observes:

“And it really seems as if it were simply a case of transmission by inheritance to one sex of what has been acquired by the other.”³

His comment is that

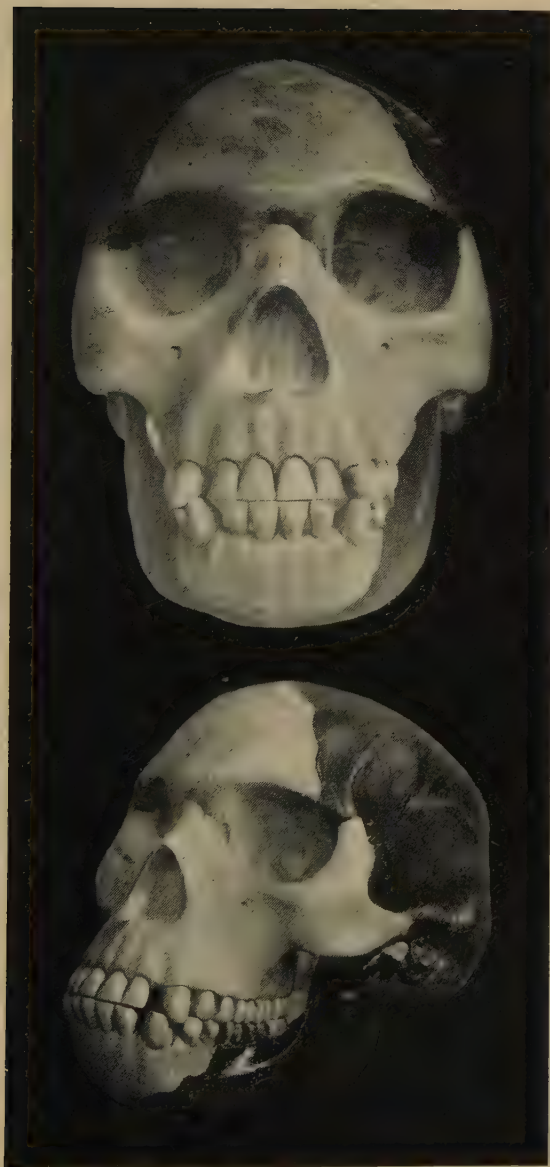
“this transmission is not an inevitable physiological process, necessarily resulting from the intrinsic conditions of inheritance; for we can see that it often does not occur, even in many cases in which we can see no external reasons why it should not do so.”⁴

¹ Hartog, “Transmission of Acquired Characters,” *Contemporary Review*, September, 1908, p. 307.

² *Heredity*, 209.

³ *Evolution Theory*, i., 233.

⁴ *Ib.*



EOANTHROPUS DAWSONI.
(By permission of the late Mr. Dawson)

But this is beside the point. Transmissionists do not insist that acquirements are *always* transmitted: they only contend that they may be. Similarly, in 1892 he admitted that there were certain cases of climatic varieties in butterflies which he could not explain "otherwise than by supposing . . . that somatic variations were transmissible."¹

In certain cases where climatic or other external influences have produced bodily modifications which appear to be hereditarily transmitted, the Weismannite explanation is that the modification has not been impressed on the germ-plasm through the body, but that the external influences have modified the germ-plasm directly, not through, but simultaneously with, the body. This rather desperate explanation is quite as difficult to accept as the simpler explanation of the Transmissionists, and it is described by Professor Dendy as "a last attempt to avoid at all costs the necessity for believing in the transmission of acquired characters."² I may point out, too, that there is no justification for assuming that an external influence must affect body-plasm and germ-plasm in the same way. The same influence might quite well stimulate the body-plasm in one direction and the germ-plasm in another. And in any case the argument is not only weak, but irrelevant. For it leaves the *fact* of the transmission unchallenged, and at the same time gives an explanation of the *process whereby it is effected* which is fatal to the Weismannite theory of the immunity of the germ-plasm from external influences.

Romanes³ finds in reflex action⁴ a strong support for the view that acquirements may be transmitted. It is rather difficult to epitomise his admirable argument, but it is to the following effect: The essence of the theory of reflex action is "that constantly associated use of the same parts for the performance of the same action will progressively organize those parts into a reflex mechanism." The prompt withdrawal, say, of the hand from painful contact with a

¹ *The Germ-Plasm*, 398.

² *Darwin and after Darwin*, ii., 69 *sqq.*

³ *Outlines of Evolutionary Biology*, 182-3.

⁴ A reflex action is one in which a reaction to external impulses takes place without any accompaniment of consciousness on the part of the organism.

hot iron is a simple instance of reflex action. For this withdrawal will take place even after the spinal cord has been severed, so that the pain of the hot iron cannot be felt. This is an adaptive action, but it can hardly have had any selection-value, since the withdrawal would be effected, in ordinary circumstances, equally well by a conscious act of will. It cannot, therefore, have been preserved by Natural Selection, since it has no appreciable value in promoting survival. Again, a dog when tickled will scratch the place, even after its cerebral hemispheres have been removed, and it has consequently been deprived of its normal power of volition. As to this Romanes says:

“Now, although the action of scratching is doubtless adaptive, it appears to me incredible that it could ever have become organized into a congenital reflex by natural selection. For in order that it should, the scratching away fleas would require to have been a function of selective value. Yet, even if the irritation caused by fleas were supposed to be so far fatal in the struggle for existence, it is certain that they would always be scratched away by the conscious intelligence of each individual dog; and therefore that no advantage could be gained by organizing the action into a reflex. On the other hand, if acquired characters are ever in any degree transmitted, it is easy to understand how so frequently repeated an action should have become, in numberless generations of dogs, congenitally automatic.”¹

And if it is difficult to see how reflex actions like these can have any selective value *even when the mechanisms are fully formed*, it is quite impossible to suppose that they can have had any such value while they were yet in the making. For if a reflex action is to count for anything in the struggle for life, it must start from the very beginning in a state of working efficiency. But, even in the case of the simplest reflex action, the machinery thus set up is extremely complicated, involving an elaborate coadaptation of parts, which, *when it first began to be constructed*, could not have occurred in any large number of individuals of a particular species. Indeed, it is hardly conceivable that it can have occurred at all, if its *origin* is dependent on germinal variations alone. One of its wheels, so to speak, might appear as a germinal variation in one individual, another wheel in

¹ *Ib.*, 81.

another. But the single wheels by themselves have no selection-value; they are only useful when combined in the mechanism, and it is practically impossible that, merely as a result of germinal variations, all the wheels should appear suddenly in a single individual, and not only *en masse*, but co-ordinated into a complex mechanism. Therefore, says Romanes:

"Unless we invoke either the doctrine of 'prophetic types' or the theory of sudden creations, I confess I do not see how we are to explain either the origin, or the development, of a reflex mechanism by means of natural selection alone."¹

On the other hand, if these reflex actions are due to use-inheritance—that is to say, to the transmission of an acquired habit—they do not require to possess the survival-value necessary for Natural Selection. For habits which are useless *may* well be perpetuated hereditarily, if they are not actually injurious and therefore liable to be eliminated by Natural Selection.

"Thus, with regard to the phenomena of reflex action in general, all the facts are such as this theory [use-inheritance] requires, while many of the facts are such as the theory of Natural Selection alone cannot conceivably explain. Indeed, it is scarcely too much to say that most of the facts are such as directly contradict the latter theory in its application to them."²

With regard to the second Weismannite objection—viz., that it is impossible to conceive how the transmission of acquirements can be effected, Weismann, with his usual fairness, repeatedly admits that this, *per se*, is insufficient.

"I do not disagree with those who say, with Oscar Hertwig, that the impossibility of forming a conception of the physiological nexus involved in the assumed transmission does not *ipso facto* constrain us to conclude that the transmission does not occur."³

Again, commenting on Hering's theories, he says:

"They make it apparent that, however much we know of the organism, we only know it in a general way, and that numberless delicate processes go on in it which leave no trace for our microscope, and that we can only recognize the final results of numerous invisible and often, in their subtlety, unimaginable factors."⁴

¹ *Ib.*, 73.

² *Ib.*, 86.

³ *Evolution Theory*, ii., 108. See, too, *Ib.*, 64, 69.

⁴ *Ib.*, 110.

The difficulty lies in imagining how a bodily acquirement—say skill as a pianist—can be impressed on the germ-cells of the individual so powerfully and completely as to produce a *precisely similar skill* in the descendant.

The difficulty is a real one, and must be frankly admitted, even though its force has at times been somewhat exaggerated. Moreover, as will appear later, it is not fatal to the conclusion for which we here contend. Various suggestions have been made as to how this impression might be effected. It is pointed out that the body is a physiological whole, with a basis of organic unity in its nervous system. Zehnder regards the blood as the medium of communication between the brain-cells and the germ-cells. Again, the protoplasm of every cell is united with the protoplasm of its neighbour cells by protoplasmic threads which traverse the cell-walls.¹ And these intercellular bridges may well make the body a protoplasmic continuity.² Weismann quotes Hering as supposing it possible that, through the interconnection of all the organs by means of the nervous system,

“the fate of one reverberates in the other, and that, when excitement takes place at any point, some echo of it, however dull, penetrates to the remotest parts.”³

In any case, the circulation of the fluids of the body must ensure some sort of general communication between its various parts. And possibly, even, there may be at work within the body some subtle process by which, as by a kind of wireless telegraphy, these various parts are brought into touch with each other. But however this may be, there does undoubtedly exist a certain definite connection, a certain amount of reciprocal action between the germ-substance and the body-substance.

“The changes which occur at puberty and after the reproductive functions have ceased, as well as those which may be artificially produced by castration, etc., prove at any rate some extremely important association between the soma as a whole and its reproductive apparatus as a whole.”⁴

¹ Hill, *The Body at Work*, 27. Weismann, *Essays*, i., 183; ii., 77.

² Wilson, *The Cell*, 60-1.

³ *Evolution Theory*, ii., 109

⁴ Romanes, *Examination of Weismannism*, 77.

The changes occurring at puberty seem to be due to the direct action of the germ-plasm. This, in spite of its segregation, at that period initiates an activity which affects the entire organism.

"It liberates 'internal secretions,' or hormones, as Professor Stirling has taught us to call them, which act upon every part of the body, enlarging the larynx, shooting forth the beard, for instance, in the boy, and producing even more important changes in his sister."¹

The effects of castration tell the same tale. For instance, the antlers develop only imperfectly in a castrated stag; and, as Cunningham remarks,

"it is obvious that if the removal of the testes can effect the development of the head, the development of the latter may affect the properties of the testes."²

Moreover, this alleged inconceivability of any communication between the body and its germ-cells is an objection which comes strangely from the mouth of a Weismannite. *Quis tulerit Gracchos de seditione querentes?* The author or supporters of so profoundly unimaginable a doctrine as Weismannism, in its later developments at any rate, cannot be heard to protest against the "inconceivability" of another theory. On this subject Herbert Spencer remarks:

"The doctrine of use-inheritance is rejected because of inability to 'conceive any means' by which a modification produced in an organ can produce a correlated modification in the germ of a descendant. Yet the alternative hypothesis is accepted notwithstanding a kindred inability which is certainly not less and may be held much greater. If Weismann's view is true, such a structure as a peacock's tail feather implies over 300,000 determinants. Multiply that by the number of such feathers, and add those of the body-feathers, as well as those of all the parts of all the organs, and then imagine the number of determinants which must be contained in the microscopic sperm-cell."³

Bastian further points out that the above example understates the inconceivability of Weismann's theory. For "the 'sperm-cell' contains a number of chromosomes, and each of these bodies is made up of a number of granules—the ids—and each

¹ Saleeby, *Progress of Eugenics*, 93.

² Cunningham, *Sexual Dimorphism*, 40.

³ *Facts and Comments* (1902), 92.

one of these granules is supposed to contain the total number of determinants referred to above, for the building up of the body, which Spencer speaks of as contained in the entire 'sperm-cell.'¹

Dealing with the same objection, Romanes pertinently refers to the fecundation of the ripe ovum *in utero* :

"It seems to me more 'inconceivable' that such an ovum should be capable of announcing, as it were, to the walls of the uterus whether or not it is in a fertilized condition than it is that, before quitting the ovary, it should have had some kind of physiological converse with its environing soma. Yet it is certain that, without any visible means of communication, the impregnated ovum is able to inform the uterus that it is impregnated; and thereupon the uterus behaves towards that ovum in an altogether astonishing manner, such as it never displays towards an unimpregnated ovum."²

Finally, Weismann himself admits that we cannot exclude the possibility of a transmission of acquirements occasionally occurring;

"for, even if the greater part of the effects must be attributed to natural selection, there might be a smaller part in certain cases which depends on this exceptional factor."³

And even so robust an opponent as Dr. Archdall Reid concedes that the germ-plasm need not be regarded as altogether insusceptible to the direct action of the environment.

"It is necessary to believe only that a very high degree of insusceptibility has been evolved in all races; a degree of insusceptibility so high that only under very exceptional circumstances, or in very exceptional germ-cells, does the environment cause any change; a degree of insusceptibility so high that the exceptions may be treated as negligible."⁴

But, as Romanes points out, admissions of this kind amount to an abandonment of Weismann's germ-plasm theory, which clearly must exclude the possibility of any occasional transmission of acquirements.

"For the very essence of that theory consists in postulating a difference between germ-plasm and the general body-substance *in*

¹ *Nature and Origin of Living Matter*, 121., n. See, too, Weismann, *Evolution Theory*, i., 349.

² *Examination of Weismannism*, App. i., 179.

³ *Essays*, i., 101.

⁴ *Principles of Heredity*, 46.

kind, such that there never *can* be any 'communication from the one to the other after the manner indicated by Darwin's hypothesis of pangenesis.'"¹

Weismannites, in short, cannot be allowed to admit the occasional transmission of acquirements, and at the same time to maintain a theory of germ-plasm which excludes any such transmission as physiologically impossible.

In the above brief and imperfect sketch I have endeavoured to give in outline the salient features of the controversy, and for fuller information the reader must be referred to the abundant literature dealing with it.

As to the merits of the question, it is obvious that the suggestions of the Transmissionists fall short of proving their theory; but the same criticism applies with at least as much force to their opponents, who have committed the initial error of putting their case far too high. As a result of this, Weismannism has been obliged to retire from one position to another till little of the original theory has been left intact. Weismann by degrees has largely modified his original views as to the extreme stability of germ-plasm, its perpetual continuity, the complete isolation of the germ-cells in multicellulars, and the influence of external influences on the germ-plasm, and he has almost reversed his theory as to the origin of variations, in order to suit his subsequent theory of Germinal Selection. According to this theory, he assumes that germ-plasm consists of a large number of different living parts which he calls Determinants. Each of these stands in a definite relation to the particular cells or kinds of cells in the organism to be developed. Each part of the organism—hand, foot, nose, etc.—has its special cells under the control of the appropriate Determinants, which last he describes as "primary constituents in the sense that their co-operation in the production of a particular part of the organism is indispensable."² They are not the *seeds*, as it were, of the particular parts, but rather their architects.³ These Determinants, as living beings, are capable of growth and multiplication, but such growth, and the rate of it, "depends

¹ *Examination of Weismannism*, 111.

² *Evolution Theory*, i., 355.

³ *Ib.*, 380.

mainly on the amount of nourishment which reaches them."¹ There will always be fluctuations of the food-supply, and, moreover, some Determinants will be stronger or more favourably situated to acquire it. Consequently, in the midst of the organism there will arise a struggle for survival between its Determinants similar to the struggle between the complete organisms. And he considers "that it is upon the unequal nutrition of the Determinants conditioned by the chances of the food-supply that individual hereditary variability ultimately depends."² Moreover, since he regards these (hypothetical) Determinants as being composed of smaller constituents (also quite hypothetical), which he calls Biophors, he considers that a similar struggle must take place between them also.³

Let us compare this conclusion with his earlier views. In 1885 he declared that the influence of the nutrition and growth of the individual upon the germ-cells must be extremely slight.⁴ In the same year he declared of the germ-plasm that

"there is very little chance of the smallest changes being produced in its molecular structure by the operation of those minute transient variations in nutrition to which the germ-cells, together with every other part of the organism, are exposed;"⁵

and referred hereditary individual variations to sexual amphimixis.⁶ In 1890 he gives up sexual amphimixis as the sole cause of variation.⁷ In 1892 he writes:

"At the present day I can therefore state my conviction still more decidedly than formerly, that *all permanent—i.e., hereditary—variations of the body proceed from primary modifications of the primary constituents of the germ*; and that neither injuries, functional hypertrophy and atrophy, structural variations due to the effect of temperature or nutrition, nor any other influence of environment on the body, can be communicated to the germ-cells, and so become transmissible."⁸

He repeatedly declared that no external conditions can affect the germ-plasm so as to produce hereditary variations. Yet in the end (1904) he is obliged to admit, by reason of his theory of Germinal Selection, that

¹ *Evolution Theory*, ii., 116.

² *Ib.*, 117.

³ *Ib.*, 119.

⁴ *Essays*, i., 172.

⁵ *Ib.*, i., 278.

⁶ *Ib.*, 279.

⁷ *Ib.*, ii., 94.

⁸ *The Germ-Plasm*, 395.

"thus there comes about what until recently was believed to be impossible; the conditions of life give rise to useful directions of variation—not directly, certainly, but indirectly."¹

That these changes of position should be so frankly admitted is a signal testimony to Weismann's fairness and openness of mind, but they severely shake the claims of his theories to be conclusive. Moreover, it is impossible to ignore the fact that these theories, particularly in their later developments, rest largely on assumptions which are unverified and probably unverifiable. In the words of Professor Hartog:

"The Master has indeed deftly woven his web of hypothesis, with its warp of forced interpretations of structures that are known, and its weft of assumptions of substructures that are unknown, into the gorgeous brocade of his theory; but it is as airy and unreal as that which left Hans Christian Andersen's Emperor stark naked in the birthday procession."²

The great value and interest of his theories can be readily admitted, but the arrogant claims for certainty—indeed, almost sanctity—sometimes put forward on their behalf are now clearly seen to have no justification whatever. Their broad principles are undoubtedly correct, but there is no need to accept them in their strictest details. We may well believe that the germ-plasm possesses a high degree of stability without ascribing to it a stability which is absolute. Indeed, for our present purpose we only require what Weismann has already, though somewhat grudgingly, conceded, that acquired characters can sometimes be transmitted.

Our conclusion, then, may be summed up as follows: In one way or another bodily acquirements must, to some extent, affect the germ-plasm.

"The living organism is a whole in equilibrium, and every rupture of the equilibrium realized at one point of the body is transmitted to the whole individual, either by the interior medium or by protoplasmic continuity."³

Consequently, a bodily acquirement must have its rebound on the germ-plasm. It does not follow from this

¹ *Evolution Theory*, ii., 378.

² *Problems of Life and Reproduction*, 201.

³ Le Dante, *Nature and Origin of Life*, 206.

that the effect produced will be sufficient to ensure the immediate transmission of the acquirement in its entirety, for the impression made on the germ-plasm may be too slight to affect its constitution to this extent. A suddenly acquired bodily character *may*, no doubt, so affect the germ-plasm as to alter its constitution, and thus be hereditarily transmitted. This, however, can happen but rarely. But if the stimulus which produces a bodily acquirement should be repeated a vast number of times, and more particularly in successive generations, the probability of its producing a permanent impression on the germ-plasm, and so becoming transmissible, is very greatly increased. When we consider, moreover, that all original hereditary variations are admitted by Weismann to have been produced by the action of external influences on unicellular organisms, we may reasonably conclude that similar influences may still operate, under favourable circumstances, to produce hereditary variations in multicellulars. In this case parental or ancestral modifications of brain-tissue must certainly, under proper conditions and in some form, be occasionally transmitted to posterity. By this means as well as by fortunate combinations of germ-plasms, brains of a more elaborate complexity will be duly produced to meet the growing needs of the evolving mind-structures, and the difficulty raised in Chapter XII. will disappear.

CHAPTER XV

THE TRANSMISSION OF ACQUIREMENTS

THE theory which denies the transmission of acquired characters has been examined at some little length because of its important bearing on the evolution of the soul, particularly at the point where the transmission is made from anthropoid to man.¹ We have seen reason to think that unless such transmission is possible to a certain extent, soul-evolution, at this point at any rate, might be, not, perhaps, stifled altogether, but seriously hampered by a lack of correspondingly advanced brains in which the evolving mind-structure could function. This difficulty would be eased if the acquirements won by a mind-structure during its earth-life could leave *some* trace of themselves on the germ-plasm, and thereby produce *some* related effect on the brains of the individual's progeny. Weismann and his school address themselves to the transmission of *bodily* acquirements *generally*, but our present quest is not so wide. We are here concerned with the transmission of *cerebral* acquirements only; or, more accurately, we are concerned to ascertain whether any modification of an individual's brain caused by the action of that individual's consciousness *can* produce any transmissible effect *whatever* on the individual's germ-plasm. And here, again, we restrict the scope of our inquiry. Weismann's argument was directed almost entirely against the idea that the *particular character* acquired by the parent could be transmitted in *exactly the same form* to the progeny. Now, even this completely identical transmission may not be impossible, but we have no need to press the case so far. For

¹ I do not suggest, of course, that man has evolved directly from any of the existing anthropoid apes (see Chapter IX.).

our present purpose it will suffice if, through the activity of consciousness in the parent's brain, the progeny should exhibit a new character, not necessarily the *same* as the parent's acquired modification, but one corresponding with and related to it, and affecting the *same tissue* (i.e., cerebral tissue), though in a somewhat different fashion. We may call this, with Professor J. A. Thomson, a "secondary" transmission, and the question here is restricted to the transmission in a secondary degree of modifications of the parent's cerebral tissue produced by the activities of the parent's consciousness. It is beyond all doubt that such modifications are produced. Mental activity leaves its mark in the furrows and sinuosities of the brain in which it functions, and the question at issue is whether the activity which causes these cerebral modifications can or cannot produce *any* effect on the germ-cells. Notwithstanding confident asseverations to the contrary, this has never yet been shown to be impossible. Moreover, the weight of authority in favour of the Transmissionist view is far too considerable to be dismissed with the scorn affected by some of the Weismannites, and neither case can yet be regarded as proved.

There can be no doubt, however, of the great stability of the germ-plasm. Without a considerable degree of stability the fixity of genera and species which actually exists would be impossible. If the character of the germ-plasm were invariably and profoundly affected by *every* acquirement of the individual, living nature would exhibit perpetual and distracting fluctuations in the place of its present uniformity. But no Transmissionist supposes such an absurdity. He does not expect a single bodily acquirement to produce an immediate and pronounced effect on the germ-plasm, though this may occasionally happen. He looks rather to the gradual accumulation of small acquired changes, all in the same direction, in a long succession of generations, so to affect the germ-plasm as to make the acquirement, in some form, ultimately transmissible. *Gutta cavat lapidem non vi, sed sæpe cadendo*. And so an acquirement, whose effect on the germ-plasm will be in the first instance inappreciable, may gradually

assert itself till it becomes part of the heritage of the race. The Transmissionist

"is by no means committed to the belief that every change of conditions will produce appreciable hereditary effects in a few generations. The point is not whether modifications are fully and completely transmitted, but whether *any trace* of them may be transmitted."¹

Brain modifications due to mental activity are acquirements of the individual. Can *any trace* of these acquirements be transmitted to the progeny? That is the question, and the only question, with which we are here concerned. Any such transmitted modification need not appear in the progeny in a form precisely similar to that of the parental acquirement; but since it is related to this acquirement, we should expect to find some resemblance, some connecting-link between the two. Weismann, as we have seen (Chapter XIII.), has admitted that possibly external influences may act, not only on the germ-cells as a whole, but upon *certain parts* of them. That is to say, he recognises that acquirements in *specific* parts of the body may act exclusively on *specific* parts of the germ-cells. Specific determinants, moreover, according to him, act as the architects of correspondingly specific parts (Chapter XIV.), and it certainly does not seem impossible that specific parts of the body should be in some sort of *rapport* with the determinants in the germ-cells of a similar order to those of their own architects. It may be truly said that no explanation can at present be given of the nature of such a *rapport* or connection between the cells in some particular part of the parent's brain and the germ-cells whose determinants will build up the corresponding part of the brain in the progeny. But, as Dr. Mercier observes, we do not know by what machinery the magnet attracts iron.² We are not, however, without suggestions as to the possible modes of connection between the body-cells and the germ-cells. Some of these have been mentioned in the previous chapter, but there is another which deserves a somewhat more detailed notice. This is the theory of the late Professor Galton,

¹ Thomson, *Heredity*, 240.

² *Contemporary Review*, December, 1908, p 705.

which is to be found in the *Journal of the Anthropological Institute*, vol. v. (1875), p. 329. Darwin's previous theory of Pangenesis supposed that all the cells of the body of a multicellular organism multiply by self-division, and during this process throw off a vast number of minute germs, or "gemmules," each characteristic of the cell from which it comes, which, when thrown off, circulate freely through the body. Gemmules have a mutual affinity for one another; they multiply by self-division, and every gemmule is capable, under suitable conditions, of developing into a cell. They are continually being collected by the reproductive organs from all parts of the body, and, when so stored up, go to form the material of the sexual elements. The sexual elements, therefore, being composed of contributions from all parts of the organism, become representative of the entire organism and are the sources of heredity.

On this theory it is not difficult to imagine that the gemmules might carry to the central store of sexual materials "acquirements" of the body-cells from which they had been thrown off. But though parts of the theory of Pangenesis have been subsequently confirmed, the theory itself is no longer accepted.

It will be observed that, as the sexual elements are thus collected from all parts of the organism into a central store, the theory may be described as centripetal in character. Weismann's germ-plasm, on the other hand, is from the first at the centre of the operations by which the organism is constructed, and his theory may therefore be described as centrifugal in character.

Galton's theory, which in many ways resembles Weismann's, notably in its centrifugal character, is also, as he declares, a modification of Pangenesis. He calls his material basis of heredity "stirp," and uses this name to

"express the sum total of the germs, gemmules, or whatever they may be called, which are to be found, according to every theory of organic units, in the newly fertilised ovum."¹

His theory rests on four postulates which he says are almost necessarily implied in any hypothesis of organic

¹ *Journal Anthropol. Inst.*, vol. v., 330.

units, and are comprised, in fact, in Darwin's Pangenesis. The postulates are as follows:

"The first is, that each of the enormous number of quasi-independent units of which the body consists has a separate origin, or germ. The second is, that the stirp contains a host of germs, much greater in number and variety than the organic units of the bodily structure that is about to be derived from them; so that comparatively few individuals out of the host of germs achieve development. Thirdly, that the undeveloped germs retain their vitality; that they propagate themselves while still in a latent state, and contribute to form the stirps of the offspring. Fourthly, that organisation wholly depends on the mutual affinities and repulsions of the separate germs; first in their earliest stirpal stage, and subsequently during all the process of their development."¹

He points to the fact that a child may have its father's eyes and its mother's mouth as showing that these two features must have had a separate origin. But further, since peculiarities, even of a microscopic kind, are transmissible by inheritance, he concludes that even the minutest parts of the body ² have separate origins. Now, the germs in the stirp are in a perpetual state of restless activity under the pressure of their mutual affinities and repulsions, and there is, in fact, much the same sort of struggle going on between them as Weismann supposes to go on in the case of his determinants and biophors. There are numerous competing germs in the place of each unit of structure, and only one of the competitors can succeed in each case. Thus, for every germ which succeeds in achieving development into a cell, there are many which fail, and these go to form the reproductive material for the next generation. It is this undeveloped residue, therefore, which constitutes the material basis of heredity, and hence the possibility of the parent's acquirements being transmitted will depend on whether, and how far, they can be communicated to this residual store of germs. Galton thinks such a communication possible, but only to a slight extent. He does not adopt Darwin's view that all the body-cells throw off numerous germs which travel freely through the body,

¹ *Journal Anthropol. Inst.*, 331.

² Weismann states that he has observed the transmission through several generations of a small pit, hardly as large as the head of a pin, in the skin of the ear, *Evolution Theory*, i., 355.

but he considers that there is undeniable evidence of the power of cells to throw off germs. Accordingly, he thinks that

“each cell may be supposed to throw off a few germs that find their way into the circulation, and thereby to acquire a chance of occasionally finding their way to the sexual elements, and of becoming naturalised among them.”¹

It will be seen that this theory supposes, what Weismann also was finally obliged to admit, that stirp or germ-plasm is present in the body-cells. Now, it is conceded even by Weismann that germ-plasm can be modified by external influences to which it is directly exposed,² and consequently the germ-plasm in a body-cell can scarcely fail to be affected by any modification acquired by that cell. Accordingly, upon the subdivision of such a cell in the ordinary course, the germs liberated would in all probability bear some impression of this acquired modification. Supposing any such germ to find its way to the residual store of sexual elements, it would there be drawn by its natural affinities to some group of corresponding germs. Thus, if the original cell had belonged to a leg-muscle which had acquired some adaptive modification in response to its environment, the liberated germ above mentioned would be drawn to some group of residual germs appropriated to the formation of that muscle, and would carry into the group the impression derived from the acquired modification of its parent cell. This impression need not, and indeed, at first, could not, enable the germ to reproduce *fully*, in any cell into which it might develop, the acquired modification of the parent cell; it could only initiate a structural tendency in that direction. This, at first, would be too insignificant to produce any appreciable effect. But if such an adaptive modification continued to be acquired during a number of successive generations, the cumulative effect would be considerable, and what was at first only a slight tendency might grow into a definite variation of the germ-plasm, which, of course, would produce an appropriate effect on the progeny. In this way a bodily acquirement might to some extent, and

¹ *Journal Anthropol. Inst.*, vol. v., 346.

² *E.g.*, *Germ-Plasm*, 422.

in some form, be transmitted to posterity. Nor is there any difficulty in supposing that such repeated modifications may occur; indeed, it is practically certain that they must. For many bodily modifications are brought about by the ordinary conditions of the environment in which a species lives; and if these conditions remain constant, each successive generation will be similarly affected by them, and will produce similar adaptive modifications to meet them.

Moreover, since the germs in the residual store are supposed to increase by self-multiplication in this latent condition, the modified structural tendency introduced by the original single germ would, by degrees, be correspondingly increased. Whether this tendency ever emerges as a structural variation will depend on the chances of the struggle between the germs possessing the particular "impression" and their fellows. If such a variation should appear and prove a help to survival, it would be rapidly increased under the operation of Natural Selection; and even without this selection-value it might survive if not actually injurious.

But we need not pursue its course farther. Enough has been said to indicate the method by which, on Galton's lines, some effect on an acquired bodily modification can be impressed on the germinal substance from which progeny springs. It will be seen, then, that even an occasional introduction of an "impressed" germ into the germinal store, though insignificant in effect at first, may in course of time prove a highly important factor in organic evolution. For, be it remembered, the germs are not to be regarded as the *seeds* of the different parts produced by them, but rather as their *architects*. The germ does not contain in itself a miniature of its appropriate part. It is rather the constructive centre from which the activities originate which build up this part; and a very minute alteration in the direction or distribution of these activities might produce considerable structural variation in the part when built up.

And what is true of the germ thrown off by muscular tissue must be equally true of a germ thrown off by cerebral tissue. The brain-cell modified by mental activity will

throw off in due course correspondingly impressed germs. We have seen already (Chapter X.) how mental activity applied to a specific purpose can effect a permanent anatomical change in the brain-tissue, directly connected with the object aimed at or the accomplishment acquired. For, as Dr. Thomson tells us, the acquisition of a new language results in the formation of what he calls a new "brain-shelf." This new brain-shelf occupies its special place in the grey matter, and is, to a great extent, independent of the shelves near it. Thus, in the case of Professor Hinshelwood's patient the Greek shelf entirely escaped the injury which befell the English, Latin, and French shelves. If any germ thrown off by a brain-area thus modified were to find its way to the central germ-plasm, it might in due time, as above described, produce a corresponding modification of some section of the germ-plasm concerned with the origination of the particular brain-area. In such case what would be the effect of this modification on the progeny? Obviously there would not be transmitted to any progeny an innate capacity for *speaking* the particular language, for this would be transmission, not only of the modification of brain-tissue acquired by the parent, but of the conscious purpose which produced it, and this belongs, not to the body, but to the mind-structure. For it is not the brain or the particular area of it which speaks the language by itself, but the consciousness which functions in the brain. Nevertheless, there might well be transmitted to the brain of the child a structural modification which would be favourable to the acquisition of the particular language, or of languages generally. And even if this modification of germ-plasm should be incompetent to transmit cerebral aptitudes so specific as these, it might at any rate transmit an increased complexity to the corresponding brain-area of the child, and thereby render it a more efficient mental instrument—an instrument, in other words, *structurally* more fitted for higher mental activities than the brain which could have been produced by the original unmodified germ-plasm. Or again, to take Weismann's instance of a parent who acquires skill as a pianist: this precise accomplishment will not be transmitted to his offspring for the

same reason, that the accomplishment belongs, not to the physical brain, but to the mind which worked in it. Yet there may well be transmitted to the child some cerebral modification which would give to its brain a special facility for the work of a pianist, or a special facility for the mastery of musical notation,¹ or perhaps merely a richer complexity of the whole of the special brain-area involved.

Hence, without prejudice to the question as to whether or not an acquirement can be transmitted in *precisely the same form* (which is all that Weismann denies), it is quite sufficient for our present purpose to maintain that acquired modifications of brain-tissue *may* be transmitted to the offspring of the acquirer in a "secondary" form.

M. Yves Delage has advanced a somewhat similar theory of the means whereby acquirements of body-cells may occasionally be transmitted to germ-cells.² In the course of the development of an individual organism, the body-cells, originally alike, gradually become specialised to serve the purposes of the different parts of the body to which they belong. This differentiation he ascribes to the influence of certain constituents or structural dispositions in the cells. But, while some of these constituents are present in the fertilised ovum from which the individual organism sprang, others appear for the first time in the body-cells, as the latter are gradually developed. Any modification of the organism or its nutrient fluids which affects the constituents originating in the ovum will, M. Delage thinks, affect the germ-cells, and thus become transmissible, while modifications which only affect the constituents originating in the body-cells will not be transmissible. Modifications which affect the blood are the most readily transmissible.

"Certain characters can be transmitted: those, namely, which correspond to a substance present, not only in the organ under consideration, but in the ovum as well. They are not necessarily characteristics of prime importance, very noticeable or indispensable to the life of the developed organism. They are characters common to the organism and to the ovum. Other characters,

¹ According to Dr. Thomson, constant practice in reading music may bring about the formation of a special registry or brain-shelf devoted to this purpose. (*Brain and Personality*, 98.)

² *L'Hérédité*, etc., 829-843.

equally important, perhaps, but determined by substances which do not exist in the ovum and only develop in the course of ontogenesis are not transmitted. The same holds true of modifications which while very noticeable, bring about no qualitative change in the composition of the blood."¹

As was shown in Chapter XI., at a certain point in human development the line of evolution was shifted from physical to mental superiority, from the body to the brain. From that point, therefore, it became peculiarly important that the advance in the complexity of brain-structures should correspond with the growing needs of mind-structures. It seems, to say the least, very doubtful whether Natural Selection alone would be competent to produce the improved brain-structures rapidly enough without the assistance of some other influence. So strongly was Romanes convinced of the insufficiency of Natural Selection as the *sole* principle of evolution that he declared in a striking passage that even if the inheritance of acquired characters should be finally disproved,

"the question would still remain whether the principle of natural selection alone is capable of explaining all the facts of adaptation; and, for my own part, I should then be disposed to believe that there must be some other, though hitherto undiscovered, principle at work, which co-operates with natural selection, by playing the subordinate rôle which was assigned by Darwin to the principles of Lamarck."²

In fact, the pretensions of Natural Selection as an evolutionary agency, or, at any rate, as the chief evolutionary agency, have encountered a good deal of criticism from various quarters. It has been doubted, for instance, whether there is really the acute competitive struggle between the different members of a species which Darwin supposed to exist. It has also been suggested that the orthodox use of the expression "struggle for existence" is too narrow, and that it should be extended so as to include the struggle of species with one another, and the struggle of living organisms with their surroundings. Again, it is questioned whether the unfavourable conditions of an environment which are supposed to act beneficially by

¹ Delage and Goldsmith, *Theories of Evolution*, 231.

² *Darwin and After Darwin*, ii., 154.

eliminating the weak do not also act prejudicially by weakening the strong who survive; and, consequently, whether favourable surroundings do not, in reality, provide a wider range of variations. It has been pointed out, moreover, that beneficial variations begin, *ex hypothesi*, in a very small way, and are therefore too minute to affect the survival of the organism possessing them. And further, that though it may be possible for the progeny to inherit the parent's variation, it is inexplicable how the progeny can add to it. Yet if it is not added to no effective beneficial variation will be produced. Lamarck's theory of heritable variations being produced by use and disuse opens a way out of the difficulty, but this way is closed to Weismann and the Neo-Darwinians.

Indeed, in the case of mankind it is quite clear that many of our most valuable mental gains cannot owe either their origin or their preservation to Natural Selection. For Natural Selection, we must not forget, acts negatively only, not positively. It deals only with variations which affect the survival of the individual. It produces nothing. It creates no beneficial variation; it only cuts off any that are so far prejudicial as to involve the question of life or death for the owner. It is obvious at once that the æsthetic, moral, and religious ideas of mankind can seldom, if ever, have had any permanent life-preserving value. On the contrary, Natural Selection, if left to itself, would have made very short work of the philanthropist or the poet. Sir E. Ray Lankester recognises this in his admission that the high development of man's mental qualities have almost lifted him above the operation of Natural Selection.¹ In this case we can understand their present survival. But how did they arise, if Natural Selection is the only principle upon which Evolution proceeds? It may be said that they appeared as variations which, though not assisting survival, did not prejudice it, and therefore were not cut off by Natural Selection. But even if this highly questionable proposition be admitted, though it might account for their preservation, it would not explain their development. For Weismann's doctrine of Panmixia shows that characters

¹ *Kingdom of Man*, 25.

which do not possess, or have lost, any survival-value tend to degenerate—not to advance.

“Natural selection not only effects adaptations: it also maintains the organ at the pitch of perfection it has reached by a continual elimination of those individuals in which the organ is less perfect. . . . Now, if this conservative action of natural selection secures the maintenance of the parts and organs of a species at their maximum of perfection, it follows that these will *fall below this maximum as soon as the selection ceases to operate.*”¹

But, so far, the inheritance of acquired characters has *not* been disproved. On the contrary, its possibility has been admitted even by its most strenuous opponents, while the objections to attributing organic evolution to the operation of Natural Selection alone grow more imposing the more they are considered.

Weismannites frequently urge against the transmission of acquirements that it does not occur in cases where it might reasonably be expected to do so. The argument at best is inconclusive, for, under our present imperfect knowledge of the conditions of transmission, expectation may easily go astray. The non-transmission of mutilations is usually relied upon to illustrate this argument. Thus, Weismann cut off the tails of twenty-two generations of mice without producing any transmitted reduction of the tail.² But surely this is one of the cases in which, for various reasons, specific transmission would be unlikely to occur. For the acquired modifications most likely to be transmitted would be those produced by long and continuous use, whereas a mutilation occurs but once in the life of an individual. Moreover, since the germs are to be regarded as architects rather than seeds, the removal of the structure *after* it has been completed could hardly be expected to impair the architectural capacity of the germ-plasm. You do not affect an architect's powers by knocking down the house which he has built. Again, on Galton's theory, any modification of the central germ-plasm is effected by means of germs thrown off from some of the related body-cells, and, consequently, the removal of the entire tail would remove at the same time the greater

¹ *Evolution Theory*, ii., 114.

² *Ib.*, ii., 66.

part of the cells from which modified germs could be thrown off. And, finally, since the tail is structurally connected with the spine, any modifications produced by its removal would, if transmitted at all, be transmitted, quite possibly, to the germ-plasm related to some other part of the spinal system.

Another argument advanced by Weismann is the non-transmission of speech.

"Furthermore, language is not transmitted to our children, although it has been practised not only by ourselves but by an almost endless line of ancestors. Only recently, facts have again been worked up and brought together, which show that children of highly civilized nations have no trace of a language when they have grown up in a wild condition and in complete isolation. The power of speech is an acquired or transient character: it is not inherited, and cannot be transmitted: it disappears with the organism which manifests it."¹

Our first answer to this would be that though the possibility of speech is inseparably connected with a due complexity of the brain and a suitable physical conformation of the head and face, yet speech in its essence belongs, not to the body, but to the mind-structure, the body merely providing the necessary machinery for its expression. Its true place is not in the system of physical, but of mental evolution, and therefore, regarded as a faculty—the faculty of representing ideas in words—it is altogether outside the class of *bodily* acquirements with which alone the transmission controversy is concerned. If, however, we identify speech with its physical machinery, the *faculty* of speech with the *power* of speaking, surely Weismann is incorrect in describing the latter as a character which is not inherited and cannot be transmitted. For, whatever view be taken of the origin of speech as a faculty, whether it be purely mental, or merely a "property" of a certain complex kind of matter, the *power* of speaking unquestionably depends on a requisite development of brain and of the proper organs of face, mouth, and throat (see Chapter X.). These adaptive modifications may have been originally acquired, or they may have been brought about solely by the action of Natural Selection; but in either case they certainly are

¹ *Essays*, i., 275.

not transient, and they certainly are transmitted. The heritability of the modifications which make speech *physically* possible can hardly be denied; and with regard to the corresponding cerebral development Bastian writes:

"Another point, depending upon cerebral development in particular directions and its transmission by heredity, is also of much importance. A child usually learns to speak slowly and with much difficulty; but I have contended elsewhere that the child would never be able to speak at all if he had not inherited from very remote ancestors certain nervous mechanisms in the brain upon which this power depends; and that if the child has to learn to speak this is due to the fact that he begins to try as soon as the appropriate nerve centres begin to develop."¹

Here, then, in addition to the various methods already mentioned by which it has been suggested that acquirements may be able to affect the germ-plasm, we have, in Galton's theory, a concrete scheme put forward under which this seems to be reasonably feasible. The position, therefore, comes to this: Weismann and the Selectionist school generally have failed to establish their doctrine that Natural Selection by itself is capable of explaining *all* the facts of adaptation. Some other principle must also have been at work. As to what this other principle may be the choice seems to lie between that of the occasional transmission of acquirements and some other hitherto undiscovered principle. Of these alternatives we are clearly entitled, if not actually bound, to adopt the first. It is true that our conclusion must be, for the present, a provisional conclusion only, but where certainty is unattainable, probability is, and must be, our safest guide. The case is thus summed up by Professor Dendy:

"On the whole, then, the available evidence seems to indicate that suddenly and exceptionally acquired characters, such as mutilations, are occasionally but only rarely inherited to such an extent as to be recognizable, while, on the other hand, characters which are due to the continued action of some external stimulus, extending perhaps over many generations, in the long run become so firmly impressed upon the organism that they affect the germ-cells as well as the somatic cells and thus become truly blastogenic."²

¹ *Nature and Origin of Living Matter*, 129.

² *Outlines of Evolutionary Biology*, 184.

Accordingly, until this conclusion is definitely disproved, we may legitimately suppose that acquired cerebral modifications are occasionally transmitted, if only in a secondary form, to the progeny of the acquirer.

The discussion has been conducted with a good deal of needless acrimony on the Weismannite side, as though the struggle were one for life or death between the opposing schools. But surely this assumption is erroneous. It is admitted on all sides that germinal variations are at any rate far more heritable than acquired variations; but this is quite compatible with the supposition that the latter may occasionally be transmitted also. This, indeed, is the view taken by the more sober minds on either side, and, as Professor Thomson justly observes,

“If modification-inheritance were known to be a fact it would in no wise exclude interpretations in terms of natural selection and other factors, for even the most thorough-going¹ Neo-Lamarckian will hardly maintain that his hypothesis, if verified, would be an all-sufficient ætiological factor, and even the most convinced Neo-Darwinians could not refuse to recognise an additional factor if that were verifiable. There is no need to pit one theory against the other in this fashion; the more factors in evolution that are discovered the better.”²

¹ Neo-Darwinians regard Natural Selection as the only cause of adaptive modification; Neo-Lamarckians admit that Natural Selection plays an important part in organic evolution, but also assign great importance to the inherited effects of use and disuse.

² *Heredity*, 242.

CHAPTER XVI

PERSONAL IDENTITY AND THE SOUL

PERSONAL identity seems to the ordinary individual to be an obvious and fundamental fact, clear beyond the need of argument, and raised far above the possibility of dispute. This personal identity of self he also regards as something permanent which transcends all the vicissitudes of his experience, and is something distinct from, and independent of, those experiences. It is also indissolubly associated in his mind with all that part of himself which he believes or hopes may survive the death of his body—in short, with his soul—though his views as to the nature and conditions of this association are usually quite vague. He does not trouble himself greatly with philosophical speculations, but believes in the existence of his soul without attempting to form any definite conception of its character and constitution. He regards it as a whole, as a unity of some sort, which vaguely comprises his mental qualities without the physical body in which they are manifested. He supposes it to be a spiritual something, without concerning himself to seek for a definition of spirit; and though, to his mind, it is certainly something distinct from the body, he probably pictures it as presenting a shadowy resemblance to his bodily form. He would certainly be startled at hearing that it had the weight of ten postage-stamps, or was shaped like a fish.¹

Whatever the intrinsic merit of such views may be, their sharp concreteness would come as a shock to the hazy incompleteness of his own beliefs. A human soul certainly need not resemble a human body, and, indeed, according to most of the current theories, it belongs to a sphere into which form and dimension do not enter.

¹ Fournier, *New Light on Immortality*, 148, 156.

Even, however, if our ordinary person does not believe in a soul which will survive physical death, he still regards his personal self as something distinct from the experiences which occur to it. But in this case the question at once arises, How is an independent personal self possible without some such background as a soul? Various attempts have been made by philosophers to answer it. Hume denied that the sense of personal identity consisted of, or rested upon, any permanent continuous reality whatever. Were this so, he said, the self would also be constant and invariable, which was contrary to experience. What we call self, he said, is really nothing but a rapid succession of perceptions. These are the ultimate data of consciousness, and there is no permanent self behind them.

"I never can catch *myself* at any time without a perception, and never can observe anything but the perception. When my perceptions are removed for any time, as by sound sleep, so long am I insensible of *myself*, and may truly be said not to exist."¹

Metaphysicians may fancy that there is some permanent self in the background, to which these perceptions may be referred, or in which they inhere. But, says Hume, setting such persons aside,

"I may venture to affirm of the rest of mankind that they are nothing but a bundle or collection of different perceptions, which succeed each other with an inconceivable rapidity, and are in a perpetual flux and movement. . . . The mind is a kind of theatre, where several perceptions successively make their appearance; pass, repass, glide away, and mingle in an infinite variety of postures and situations. . . . The comparison of the theatre must not mislead us. They are the successive perceptions only, that constitute the mind; nor have we the most distant notion of the place where these scenes are represented, or of the materials of which it is composed."²

We may observe in passing that, even while denying the existence of anything at the back of this stream of perceptions, Hume implicitly affirms it, by admitting that there must be a "place" in which the perceptions occur. But beyond this, the question still remains, Assuming that the identity which "we ascribe to the mind of man is only

¹ Hume, *Personal Identity* (Green and Grose), i., 231.

² *Ib.*, 321-2.

a fictitious one,"¹ what gives rise to our *sense* of personal identity?

Hume has two explanations, but neither of them is effective. He says that we have a distinct idea of any object (say a rock) which remains invariable and uninterrupted notwithstanding the passage of time,

"provided all the parts continue uninterruptedly and invariably the same, whatever motion or change of place we may observe either in the whole or in any of the parts."²

But we have also a distinct idea of several different objects existing in succession, and connected together by a close relation.³ Now, the first of these ideas is strictly an idea of identity, the second an idea of diversity. Yet by a "propension" of our nature we come to regard the *succession* as a sort of whole in itself, and to transfer to it the idea of identity which properly belongs only to an invariable and uninterrupted object. The process is altogether illegitimate, but

"in order to justify to ourselves this absurdity we often feign some new and unintelligible principle, that connects the objects together, and prevents their interruption or variation. Thus, we feign the continued existence of the perceptions of our senses, to remove the interruption; and run into the notion of *soul*, and *self*, and *substance*, to disguise the variation."⁴

Though he elaborates this explanation at some length, he is apparently not much impressed by it himself, for he adds:

"But lest this argument should not convince the reader, though in my opinion perfectly decisive, let him weigh the following reasoning, which is still closer and more immediate."⁵

Put shortly, the argument is as follows: If the identity which we attribute to the human mind were a real identity, it would run all the different perceptions into one, and deprive them of all their distinctive characters, which obviously does not occur. On the contrary,

"every distinct perception which enters into the composition of the mind, is a distinct existence, and is different, and distinguishable, and separable from every other perception, either contemporary or successive."⁶

¹ Hume, *Personal Identity* (Green and Grose), 329.

³ *Ib.*, 322.

⁴ *Ib.*, 323-4.

⁵ *Ib.*, 329.

² *Ib.*, 325.

⁶ *Ib.*, 329.

The identity, therefore, which we attribute to the train of perceptions constituting the human mind can only be due to the association of their ideas in our imagination. Accordingly,

“Identity is nothing really belonging to these different perceptions, and uniting them together, but is merely a quality which we attribute to them, because of the union of their ideas in the imagination when we reflect upon them.”¹

It is true, however, that these separate and diverse perceptions are linked together by memory, and

“as memory alone acquaints us with the continuance and extent of this succession of perceptions, 'tis to be considered, upon that account chiefly, as the source of personal identity.”²

But the memory which is here quietly smuggled in is a new and most important factor which entirely alters Hume's original position. The self, it now seems, is not merely a rapid succession of diverse perceptions, but a succession of which the successive parts are *remembered*. But who or what remembers them? Who or what “reflects” upon them when they are past? Where is Memory seated? Not in the perceptions themselves, for these, *ex hypothesi*, “glide away,” and are done with. Imagine a person situated in a dark room, into which a light was periodically flashed. Each succeeding flash would be a distinct perception to him while it lasted, but no single one of such perceptions could give him any information about the others. And if he ultimately came to group the successive flashes into one series, he must accomplish this by means of some faculty or faculties outside the perceptions themselves. Memory must, of course, form part of such a grouping process, and therefore memory, at any rate, must be something outside the perceptions which are grouped.

Much the same objections apply to the theories of the later Associationists, of whom John Stuart Mill may be conveniently taken as an example. Mill was more keenly alive to the difficulty than was Hume, but he was no more successful in getting over it.

¹ Hume, *Personal Identity* (Green and Grose), 330.

² *Ib.*, 332.

"We have no conception," he says, "of Mind itself, as distinguished from its conscious manifestations. We neither know nor can imagine it, except as represented by the succession of manifold feelings which metaphysicians call by the name of States or Modifications of Mind. It is, nevertheless, true that our notion of Mind, as well as of Matter, is the notion of a permanent something, contrasted with the perpetual flux of the sensations and other feelings or mental states which we refer to it; a something which we figure as remaining the same, while the particular feelings through which it reveals its existence change. . . . The belief I entertain that my mind exists, when it is not feeling, nor thinking, nor conscious of its own existence, resolves itself into the belief of a Permanent Possibility of these states."¹

This belief may be shortly described as a belief that a feeling under certain conditions—say the shock of a plunge into cold water, or the emotional pleasure caused by music—is capable of recurring under similar conditions. But what, again, is this something which believes if it be not something outside the feelings themselves? Or again, how is this succession of manifold ideas to be associated into the unity of a self, seeing that ideas, *per se*, cannot associate themselves. Indeed, Mill himself is obliged to succumb to the difficulties which his theory raises. For at the end of the same chapter he writes:

"The theory, therefore, which resolves Mind into a series of feelings, with a background of possibilities of feeling, can effectually withstand the most invidious of the arguments directed against it. But, groundless as are the extrinsic objections, the theory has intrinsic difficulties which we have not yet set forth, and which it seems to me beyond the power of metaphysical analysis to remove."²

He proceeds to point out that, besides present feelings and possibilities of present feelings, there are memories and expectations; and though these in themselves are *present* feelings, yet each of them involves a belief in something more than its own present existence. A memory involves the belief that the feeling remembered is something which actually existed in the past; an expectation involves the belief that the feeling to which it refers will actually exist in the future.

"If, therefore, we speak of the Mind as a series of feelings, we are obliged to complete the statement by calling it a series of feelings

¹ *Mill on Hamilton*, chap. xii., 205.

² *Ib.*, 211-2.

which is aware of itself as past and future; and we are reduced to the alternative of believing that the Mind, or Ego, is something different from any series of feelings, or possibilities of them, or of accepting the paradox, that something which *ex hypothesi* is but a series of feelings, can be aware of itself as a series. The truth is, that we are here face to face with that final inexplicability, at which, as Sir W. Hamilton observes, we inevitably arrive when we reach ultimate facts."¹

The Associationist theory of self thus breaks down altogether. As William James observes:

"The class of phenomena which the associationist school takes to frame its theory of the Ego are feelings unaware of each other. The class of phenomena the Ego presents are feelings of which the later ones are intensely aware of those that went before. The two classes do not 'fit,' and no exercise of ingenuity can ever make them fit. No *shuffling* of unaware feelings can make them aware. To get the awareness we must openly beg it by postulating a new feeling which has it."²

In fact, in one way or another, Associationists must "beg Memory, knowledge on the part of the feelings of something outside themselves." According to the Associationist theory, all the individual thoughts and feelings which have succeeded each other throughout the past up to the present are supposed to have grouped themselves together, in some mysterious way, on their own account. But

"no possible number of entities (call them as you like, whether forces, material particles, or mental elements) can sum *themselves* together. Each remains, in the sum, what it always was; and the sum itself exists only *for a bystander* who happens to overlook the units and to apprehend the sum as such; or else it exists in the shape of some other effect on an entity external to the sum itself."³

Moreover, even if the Associationist explanation be a true account of the constitution of the personal self, it in no way explains our *sense* of it, or how we came by this sense. For a series of thoughts and feelings which had succeeded in grouping themselves into a unity could only give rise to the idea "a set of thoughts and feelings exists"; it could not give us, what each of us possesses, the idea "*I think, I feel.*" An ingenious modification of the Asso-

¹ *Mill on Hamilton*, chap. xii., 212-3.

² *Principles of Psychology*, i., 359 note.

³ James, *Text-Book of Psychology*, 198.

ciationist theory was propounded by James himself. Contrasting the opposing theories of the Spiritualist or Transcendentalist and the Associationist schools, James points out that

"if, with the Spiritualists, one contend for a substantial soul, or Transcendental principle of unity, one can give no positive account of what that may be. And if, with the Humians, one deny such a principle and say that the stream of passing thoughts is all, one runs against the entire common sense of mankind, of which the belief in a distinct principle of self-hood seems an integral part."

He adds, with an amusing appreciation of the difficulties of the case:

"Whatever solution be adopted in the pages to come, we may as well make up our minds in advance that it will fail to satisfy the majority of those to whom it is addressed."¹

Beyond all doubt the claim for a personal identity of some sort is universal and persistent. The question is as to how it can be satisfied. For a full discussion of the problem the reader is referred to James's *Principles of Psychology*, vol. i., chap. x. Put shortly, however, the effect is somewhat as follows:

It will be remembered (Chapter I.) that the self has two aspects, the "*I*" and "*Me*"; the knowing and the known self. Whatever *I* am thinking about, my thought is suffused with a certain awareness of *myself*—i.e., the *Me*. The self, therefore, is at once a knowing subject and a known object. Now, in its aspect of the *Me*, the known object, the self's identity differs in no way from that of any other external object, such as a tree or a rock. These we regard as preserving their identity, in spite of constant changes in their constituent parts, because in essentials they remain the same, and such changes are gradual and continuous. It is a sort of unity in multiplicity which, if, in strictness, paradoxical, is broadly intelligible. Still, this sameness cannot be legitimately converted into any kind of metaphysical unity in which all differences disappear.

But though the *Me* cannot lay claim to a perfect self-identity, is not the *I*, the knower, in a position to do so? Is not the *I* a permanently abiding principle of psychical

¹ *Principles of Psychology*, i., 330.

activity which is always identical with itself? The common sense of mankind affirms that it is; and yet, says James, reflection will hardly justify this idea, or at any rate will not proclaim its necessity, for *our passing states of consciousness* supply all that is needed. This succession of conscious states, like Hume's rapid succession of perceptions, is not conscious of itself as a series, but each passing thought collects and binds together for the moment those, or some of those, which have preceded it. Thus, each passing thought becomes a momentary personality, yielding up, as it passes, all its contents to its successor, which in its turn takes up the torch of self for its own brief existence. James considers that these passing states of consciousness

"are all that psychology needs to do her work with. Metaphysics or theology may prove the soul to exist; but for psychology the hypothesis of such a substantial principle of unity is superfluous."¹

The process by which these fleeting selves arise and disappear—the power by which each successive *I* appropriates the *Me*—is thus described by the author of the theory:

"Each pulse of cognitive consciousness, each Thought, dies away and is replaced by another. The other, among the things it knows, knows its own predecessor, and finding it 'warm,' in the way we have described, greets it, saying, 'Thou art *mine*, and part of the same self with me.' Each later Thought, knowing and including thus the Thoughts which went before, is the final receptacle—and appropriating them is the final owner—of all that they contain and own. Each Thought is thus born an owner, and dies owned, transmitting whatever it realized as its self to its own later proprietor. As Kant says, it is as if elastic balls were to have not only motion but knowledge of it, and a first ball were to transmit both its motion and its consciousness to a second, which took both up into *its* consciousness and passed them to a third, until the last ball held all that the other balls had held, and realized it as its own. It is this trick which the nascent thought has of immediately taking up the expiring thought and 'adopting' it, which is the foundation of the appropriation of most of the remoter constituents of the self. Who owns the last self owns the self before the last, for what possesses the possessor possesses the possessed. It is impossible to discover any *verifiable* features in personal identity which this sketch does not contain."²

¹ *Text-Book of Psychology*, 203.

² *Principles of Psychology*, i., 339-40.

It will be observed that James, like the Associationists, makes memory the basis of our sense of self. But though he avails himself of its—most necessary—help, it is impossible to find any logical place for it in this cinematographic procession of thoughts which flash into momentary existence and perish. More fatal still is the objection pointed out by Dr. Sidis—namely, that even if James's scheme should suffice to account for consciousness, it fails to account for self-consciousness, which is of the very essence of personality. For the passing thought in which James places the self is, as he prefers to consider, not conscious of its own existence. Its knowing is not immediately known.

"It is only known in subsequent reflection. Instead, then, of the stream of thought being one of *con*-sciousness, 'thinking its own existence along with whatever else it thinks' (as Ferrier says) it might be better called a stream of *Sci*ousness pure and simple, thinking objects of some of which it makes what it calls a 'Me,' and only aware of its 'pure' Self in an abstract, hypothetic or conceptual way."¹

Again, the passing thought is merely

"the hook from which the chain of past selves dangles, planted firmly in the Present, which alone passes for real, and thus keeping the chain from being a purely ideal thing. Anon the hook itself will drop into the past with all it carries, and then be treated as an object and appropriated by a new Thought in the new present which will serve as living hook in turn."²

Here, then, we have the picture of a self which does not know itself, and is only apprehended as a self after it has passed away; an intense moment of consciousness which is nevertheless incognisant of its own existence.

"The present moment of consciousness is thus, as Mr. Hodgson says, the darkest in the whole series. It may feel its own immediate existence—we have all along admitted the possibility of this, hard as it is by direct introspection to ascertain the fact—but nothing can be known *about* it till it be dead and gone."³

In a later work James declares that consciousness has no independent existence and ultimately rests on the physical function of—respiration.

¹ *Principles of Psychology*, i., 304.

² *Ib.*, 340-1. ³ *Ib.*, 341.

"The stream of thinking (which I recognize emphatically as a phenomenon) is only a careless name for what, when scrutinized, reveals itself to consist chiefly of the stream of my breathing. The 'I think' which Kant said must be able to accompany all my objects, is the 'I breathe' which actually does accompany them. . . . Breath, which was ever the original of 'spirit,' breath moving outwards, between the glottis and the nostrils, is, I am persuaded, the essence out of which philosophers have constructed the entity known to them as consciousness. *That entity is fictitious, while thoughts in the concrete are fully real. But thoughts in the concrete are made of the same stuff as things are.*"¹

It is needless to discuss this remarkable theory at length, and it is only quoted to show how emphatically James in his later speculations repudiates the idea of any sort of permanent principle behind the thoughts. For him the thoughts are the thinker, and the thinker is the breather.

What, then, is the conclusion to be drawn from these various attempts to explain—or explain away—the idea of a personal identity? This idea is admitted, even by those who deny its validity, to be universal and persistent among mankind. It is, in fact, the foundation-stone of our whole social organisation. Without it our social existence, with all its multitudinous relations, would be impossible and unthinkable. It is, at the very least, an indispensable postulate of human life, and those who impugn its validity are bound to show wherein it is unreal, how the error arose, and what is the truth to be enthroned in its place. But one and all they have failed to do so. None of the theories which seek to make a self out of its perceptions or a thinker out of his thoughts can present an explanation which is even apparently coherent without covertly postulating something to which the experiences occur, something behind them which can preserve and co-ordinate them. But this something which is outside and behind the self is, in fact, just what we mean by the soul. It seems, therefore, that the existence of a soul is essential to the validity of the idea of personal identity which is one of the inexpugnable factors of human thought and the basis on which human society in its broadest sense must rest. The self, indeed, is not the soul, but without the soul, or something like it, the idea of a self could never have arisen.

¹ *Essays in Radical Empiricism*, 37.

And thus on the mental as well as on the physical side we find testimony which points to the inevitable existence of a soul. The materialist attempt to explain mind and mental action as a mere property of matter fails, if only for the reason that mind is a necessary prerequisite to the very conception of matter (Chapter II.). And the analogous theory which seeks to locate the self in its own experiences breaks down from a similar inability—to wit, the inability to imagine how experiences can occur to themselves. It is only by dint of experience and the adaptations of the individual to meet it that evolution can proceed, and it is only by the aid of mind in some form that experience can be apprehended at all. But in man mind has risen to the level of the self-conscious, and of this the self is an absolutely inseparable element. For man, mind without a self is simply inconceivable, and a self, as we have now seen, can only be intelligibly accounted for by the supposition of a soul which is behind it. We shall now proceed to consider the nature of the relation between the two.

CHAPTER XVII

THE SOUL AND THE SELF

ALL empirical attempts to account for the idea of the self have now been shown to be unsatisfactory, and we therefore seem compelled to fall back on some transcendental explanation, some explanation which postulates the existence of the soul as a metaphysical entity; a something in the background which transcends our present experience, and to which the self, with its various mental faculties, operations, and affections, may be referred. James himself in his earlier views, though insisting on his neutral position, was not hostile to some such theory.

“I confess, therefore, that to posit a soul influenced in some mysterious way by the brain-states and responding to them by conscious affections of its own, seems to me the line of least logical resistance, so far as we have yet attained.”¹

At this point, however, his own argument was only half-way through, and his final conclusion was that if we are to embark on metaphysics at all (a course which he deprecates in Psychology), the idea of a universal spirit seemed preferable to that of a number of separate souls.

“For my own part I confess that the moment I become metaphysical . . . I find the notion of some sort of an *anima mundi* thinking in all of us to be a more promising hypothesis, in spite of all its difficulties, than that of a lot of absolutely individual souls. Meanwhile, as *psychologists*, we need not be metaphysical at all. The phenomena are enough, the passing Thought itself is the only *verifiable* thinker, and its empirical connection with the brain-process is the ultimate known law.”²

These extracts clearly sum up James's position. He naturally upholds his own account of the matter, but failing that, he falls back upon a Transcendental explanation.

¹ *Principles of Psychology*, i., 181.

² *Ib.*, 346.

The concession is valuable and significant, partly because James was a psychologist of the first rank, and partly because it shows how tenaciously the belief in some psychical explanation of the question lingers even in a reluctant mind.

Now, from the Transcendental point of view the soul must be regarded either as a principle of activity, or as a substance. From what has already been said (Chapter VI.) it will be obvious that we here incline to the latter belief. This will be adopted, however, with some modification, and, we shall pray in aid, the former belief also. Substance, in its original use, connoted little but actual existence. It might be defined, so far as definition is possible, as pure Being. It was spiritual in its nature, and therefore (with some exceptions) it was usually regarded by philosophers as being devoid of the material property of extension. In the past, however, the division between mind and matter was held to be more abrupt than it seems to modern thought. The study of radio-activity has shown us that the ponderable matter known to our senses can be resolved into imponderable electrons. This etherealising of matter (which may be but the first step in a long process) decidedly reduces the distance which divides it from mind; and on the supposition that the soul is wrought out of quasi-ethereal mind-stuff (Chapter VI.), mind and matter may in their origins lie very close to each other. In this case, since mind and matter have alike a spiritual origin, it does not seem impossible that a very fine kind of matter like the neurons of the brain might be capable of receiving a stimulus from some form of mental activity. It has been shown that in the world of to-day there is no absolute barrier between animate and inanimate nature, that the laws of life mingle and sometimes modify each other; and similarly, in the unpenetrated regions which lie round the fountain-head of mundane existence, mind-stuff and matter-stuff (ether) may represent two successive stages in that cosmic evolution through which a general continuity must necessarily run. If this be so, there is no insuperable difficulty in ascribing to mind-stuff the extension usually regarded as an attribute of matter only. And, in truth, this attribute of extension is nearly always covertly introduced into our discussions of

mind. We can only think in terms of experience, and our language, consequently, is moulded on our thought. If we speak of Substance as pure Being, it is still quite impossible to conceive of Being in any form which does not occupy some portion of space. We may conceal the impossibility under a negative definition, and speak of mind as being non-material, but the difficulty is still there, and leaps out to confront us at our first step forward. It is due, no doubt, to the imperfection of our faculties, and need not be taken to represent absolute reality. It is hard to suppose that existence in its ultimate form can be subject to the limitations of matter; but this mystery may be left to veil the solemnity of the Supreme, and need not be dragged down into human life.

Now, ponderable matter, as we have seen, is itself a flux, the produce of a force impinging on the imponderable ether. And from this we have inferred that mind is also fashioned by a force impinging on the quasi-ethereal mind-stuff. The impinging force is in either case of a spiritual origin, though spiritual energy may employ a material instrument—*e.g.*, electricity; and thus mental and material structures alike are made *and sustained* by an unflagging stream of energy proceeding originally from a spiritual principle. Consequently, the extended soul of our hypothesis will be a structure which is nearer to matter than the Substance of the schoolmen, but which still depends for its existence on the activity of a spiritual principle. Let us now consider if in any way personality can conceivably attach to such a structure. Self-consciousness is obviously essential to personality, and it is often objected that, though matter may conceivably be conscious of a feeling, it cannot possibly be conscious of itself as being conscious. It cannot turn round and contemplate its own states. Is not this objection fatal, then, to our mind-structure, which at any rate shares with ordinary matter the property of extension in space?

It is the old difficulty—How can mind and matter interact?—in a slightly different form, and the solution can only be found by showing some sort of continuity between them, and between them and the Spirit from which

they both emerge. Now, on any Spiritualist theory a point must somewhere be reached where Spirit manifests itself as something material, however rarefied a form this material something may assume. But mysterious as this process must be, we may once more find in the physical world hints which will help us to interpret the world of Spirit. For as we see here that the ponderable matter of our senses is formed almost as mysteriously out of the imponderable ether, so we may be able dimly to imagine that in the higher realms of existence the unextended can, in some unapprehended way, be transformed into the extended. Attempts to reduce such ideas into definite language vary, of course, with the standpoint from which the subject is approached, but they are seldom very successful. One of the latest of these, M. Bergson's, may be given as an example. The active principle in his scheme is what he calls the "life impetus" (*élan vital*), which is a spiritual force, and consequently unextended. In its nature it is a concentration of spiritual energy which is best described as a "tension," and matter is a relaxation of this inextensive tension into the extensive. Elsewhere he describes matter as a congealed part of the substance of the life impetus. It is a sort of by-product thrown off or deposited by the life impetus in its course. Though, in its primitive form, not positively extended, it is "extensive"—that is to say, it possesses certain elements of extension which M. Bergson calls "extensity." Originally and naturally it is an indivisible unity; but under the process of relaxation it falls into the grip of the intellect (also a by-product of the life impetus), which converts its extensity into extension, and breaks up the original continuity of matter into the distinct and separate objects of the external world. As an explanation this does not explain very much, but as a theory it is interesting and ingenious, and it contains a suggestion as to the creative method obtaining in the Universe to which we shall recur later.

We may suppose, then, that in the human soul we have a structure which, though extended, cannot properly be described as material in the sense in which this term is commonly employed. It has no resemblance to the ponder-

able matter of our senses; it is finer even than the imponderable ether of our inference. It is, in fact, the nearest conceivable approach to spirit. Surely, then, it is not impossible that a structure of this delicacy, suffused through and through with spiritual energy, might be able to contemplate its own states and activities, and so to achieve the self-consciousness essential to personality.¹

It is further objected, however, and with a certain amount of truth, that facts contradict the supposition of any really stable self. The self of the child, it is said, of the young man, of the man in his prime, and the man in senile decay, is not one and the same self, but a succession of different selves. In a sense this is indisputable. It is indisputable that the character of these several selves differ from each other, yet in most of us there persists an inexpugnable impression that all these successive variations are somehow linked up together into a continuous unity. This impression insists on being reckoned with. If not accepted as veridical, it must be explained away; but, as we have seen, the various empirical explanations of this sense of personal continuity are all unsatisfactory. Empiricists may declare that the notion of a permanent soul is inconceivable, but it is clearly the only explanation which will explain the facts; and moreover, if it can be regarded as an *extended* mind-structure, the inconceivability disappears. Such a mind-structure might well constitute a permanent basis for all the different selves which appear, each in turn, to usurp the whole throne. For these in reality only represent the different qualities which from time to time are manifested by the human mind-structure in the course of its history. Now, the development of the soul under the conditions known to us can only be effected by contact with experience. Whatever may be the case with regard to a discarnate soul, the incarnate soul of a human being does not apparently originate action on its own account. Its activities, so far as they are known to us, are mainly, at any rate, responsive. They are reactions to external stimuli which reach it through the body or brain with which it is associated. Thought, even of the most abstruse kind, is no exception to this

¹ For the manner in which this is effected see Chapter VIII.

rule. The philosopher, as he sits in his study thinking deeply over the system which he is working out, does not in truth originate this mental activity. In reality it is a response to a long course of previous stimulation furnished by education, discussion, and so forth. No thought would apparently be possible to a soul with no previous knowledge, situated in a blank vacuum and wholly cut off from experience, except, perhaps, a consciousness of bare existence. For the mind-structure must be regarded as being endowed rather with potentialities than with positive qualities.

"The components of our mental equipment are not actual but contingent existences. We know them as mental states, but it is really more accurate to describe them as capacities for mental states."¹

They are capacities for response to external stimuli, capacities for modification by external conditions, due to, and varying with, the mental structure of the particular soul.

The problem as to how or where this interaction between the soul and its environment takes place is one of the greatest perplexity. The attempt to find a definite seat for the soul in the brain has been altogether abandoned. Some, therefore, like Stahl and Hudson, have supposed the soul to be diffused through the whole body. It might equally well, I submit, be supposed to envelop it. But the question of the actual site of the soul does not seem to me of great importance, provided that some adequate contact and interaction with the brain be secured for it. Such contact and interaction might be provided (on the theory here suggested) by means of mind-stuff lines of communication, even if the soul dwelt altogether apart from the body. Lotze supposed the soul to be in contact with the brain only at certain highly specialised points in the latter, and to react to the stimulation of these only. This supposition has been to some extent corroborated by the successful localisation in the brain of many of the mental functions, and there seems no reason why the number of such specialised points should not be increased as human development proceeds. But however this may be, it is plain that the

¹ *Some Problems of Existence*, 16.

nature of any interaction between the soul and the brain will depend in the first place on the stimuli supplied to the soul through the brain. The number and character of these will, in turn, depend, partly, of course, on the environment, but partly also on the body and brain through which they are furnished. In the organism of the child, for instance, they will be fewer and less complex than in that of the fully developed man, and the soul's response will be proportionately smaller and simpler. Even the same objects may appear quite differently to the two, and evoke quite different responses. Consider, for instance, how different would be the mental reaction of a child and of a man to the sight of a cheque for £100,000. To the one it would be just a piece of paper with something written on it; in the other it would rouse visions of wealth, or happiness, or salvation from ruin, or opportunities of useful activity, or the realisation of cherished hopes, and so forth. Here, then, surely, is the explanation of the different selves of the child and the man. The difference lies, not in the soul, but in its respective reactions to different stimulations. The child's soul, though undeveloped, is not an incomplete structure; all its potentialities are there, and are waiting only for the fuller development of manhood and the touch of the proper impulses to spring into activity. But during childhood the impinging impulses are relatively small and simple, and the self of the child is correspondingly attenuated. The larger, the more varied, the more strenuous experience of later years makes larger calls on these potentialities, and evokes in due course the fuller and more complete self of the man. And as it is only through the brain that these challenges strike the soul, so, as the cerebral mechanism becomes weaker or degenerate through disease or old age, the self tends to dwindle once more to the narrower self of childhood. The soul's powers are unimpaired, but the enfeebled brain sends fewer and simpler impulses to evoke them, and perhaps can only transmit imperfectly the volitional messages of the soul's response. The *soul* and its unity remain untouched: it is only the *self* in which it is manifested that is changed.

The soul and the self are thus one, though not identical.

The soul is the permanent something behind our various mental faculties, operations, and affections, to which they may all be referred, and the self as a manifestation of the soul partakes of this permanence. It is the sum of the soul's response to its environment. It is the emergence into activity or actuality of those particular qualities of the soul which are affected by that environment, and the combination of these qualities constitutes the individual's character. The soul, in fact, may be compared to a piano-forte. The full keyboard is there, but its response is simple or complex according to the stimuli applied to it. The stumbling fingers of the beginner can call forth nothing but the simplest melodies; it is only under the touch of the skilled performer that its full capacities are made manifest. Again, different sound combinations are produced when different successions of notes are struck. These selves, so to speak, manifested by the instrument, vary with the stimuli which assail it; yet the unity of the instrument persists through them all. The range of stimuli which affect any individual soul need not, under ordinary circumstances, be very wide. In the ordinary settled life of civilized society the environment retains its main features unaltered for most of us, though it presents different points of contact to different souls, and to the same soul at different times. Yet if circumstances should cause it to be suddenly and radically altered, how often do we see new and wholly unsuspected qualities appear in the self, or old and apparently established qualities disappear in response to the change! But the soul and all its qualities, actual and potential, endure through every variation of the self. The self, indeed, is the soul, but it is not the whole soul. The soul is the instrument, experience is the player, the self is the tune.

Nevertheless, though the soul is to be regarded as something permanent, it must not be regarded as something incapable of change. It is, as we have seen, a product of evolutionary change in the past, and it would be strange indeed if its capacity for advancement should cease at the very point when its future looks brightest. On the contrary, just as in the physical brain no nervous current

passes through it without making a new path in the brain-tissue or deepening an old one, so we must suppose that in the soul every mental activity which takes place makes some minute modification in its structure. It develops, in fact, through the experience acquired by the selves. Even philosophers like Mr. McDougall, who regard Mind as being immaterial and unextended, feel obliged to endow it with a sort of fictitious structure which is capable of modification by experience.

"If we use the phrase 'the structure of the mind' to denote comprehensively the sum of those enduring internal conditions by which the play of mental process and mode of behaviour of an organism are determined at each moment of its life, then we may say that experience modifies the structure of the mind, and that it is through the persistence of these modifications that past experience influences present behaviour and present mental process. Some part of the structure of the mind is innately determined or inherited; and all that is added to it or changed in it by the course of experience is usually and conveniently included under the term memory."¹

Language of this kind is, of course, only figurative; for it is quite impossible to conceive of any structure, in the ordinary sense of the term, which is unextended, a structure belonging to something which does not exist in space. If, however, the mind-structure be regarded as having extension, the difficulty disappears, and we can then follow Mr. McDougall in supposing memory to be "conditioned by the persistence of modifications of psychical structure or capacities."² Experience, it is true, will effect modifications in the brain-tissue also. Every nerve-current is a wave of rearrangement. But memory resides, not in these, but in the correlative modifications of the mind-structure. The soul, moreover, does not merely register its experiences, it also assimilates them. For, as will appear directly, an experience may be produced in a transmuted form. The soul's first response to a new stimulus may be largely automatic; its response to a repetition of the same stimulus will certainly be more or less purposive. Under further repetition its response will grow more and more effective, till this trained response grows into a specific ability, which

¹ *Body and Mind*, 130.

² *Ib.*, 345.

endures after the particular stimuli have long been forgotten. The musician does not remember all the exercises which have made him proficient, but without these exercises his proficiency would not exist.

As to the actual *process* of memory, we may suppose that this is conducted somewhat as follows: A stimulus from the brain elicits an appropriate response from the mind-structure, thereby producing a certain modification of the latter. In the case of an organism which is merely *conscious* (a lower animal's, for instance), the process may stop there. The experience will be duly registered in the creature's mind, and will in this way influence its subsequent conduct. The modification of the mind-structure will affect its response to any future experience of a similar character, though this modified response may not be apprehended by a merely conscious organism as a definite memory. The response will take the form of a thrill in the mind-structure, and this primary responsive thrill will be concerned only with the immediate present. But in the case of a self-conscious soul, the primary responsive thrill will be followed by a secondary thrill. And in this secondary thrill we may suppose that the particular modification will be apprehended, not merely as a factor of its immediately present conduct or activity, but as a permanent character of its being. Thus apprehended it will drop duly, with all its psychical contents, into its proper place in the soul's history, thereby bringing with it a sense of the *past*, and this consciousness of past experience, the consciousness, as Professor Ladd puts it, that "I *was*" no less surely than "I *am*,"¹ is the fundamental fact of memory and our conception of a continuous self.

Dr. Morton Prince in his interesting work on *The Unconscious* insists that memory depends on what he calls the "conservation" of experience. Many, perhaps all, of the incidents of our lives are conserved, though they may be incidents of which the individual has never been even dimly aware. Even if they are never recalled (or recollected) they are registered somewhere, and this registration is the basis of memory. Dr. Prince, it is true, rejects the idea

¹ *Philosophy of Mind*, 125.

of this registration taking place in any psychical repository, such as a soul, and regards it as physical in character. Pointing to the fact that every mental process is accompanied by a correlative physical process in the brain, he supposes the register to consist of a series of "traces" (sometimes called "engrams") left in the neurons of the brain. Many of these registered experiences, however, cannot be recalled at will, but may spring to light under suitable stimulation. There is also a remarkable feature about this registration which throws a most instructive light on its character. When a sense-experience is conserved it appears to be registered not merely as an experience of that particular sense—*i.e.*, something heard, seen, touched, which, if recollected at all, can only be recollected in its original form—but as a sort of organic registration which can be reproduced in forms other than its original form. This registration department, so to speak, is within the domain of the subconscious (which will be discussed later), and consequently is easily accessible during hypnosis. One of Dr. Prince's patients, B.C.A.,

"looked into a crystal and saw there some printed words which had no meaning for her whatever and awakened no memory of any previous experience. It was afterwards found that these words represented a cablegram message which she unconsciously overheard while it was being transmitted over the telephone."¹

Here we have a subconscious auditory experience reproduced as a visual experience: something which had been heard recollected as something seen.

"As a memory it was a conversion or *translation* of an auditory experience into terms of another sense. Now the conversion must have been effected by some mechanism outside of consciousness; that is to say, it was not an ordinary visualization, *i.e.*, intensely vivid secondary images pertaining to a *conscious* memory, as when one thinks of the morning's breakfast table and visualizes it; for there was no conscious memory of the words, or knowledge that there ever had been such an experience. The visualization, therefore, must have been induced by something not in the content of consciousness—something we have called a secondary process of which the individual is unaware."²

What, then, is the something in the background which can not only conserve the particular experience, but can

¹ *The Unconscious*, 58.

² *Ib.*, 91.

also transmute it ? Is it neural or psychological ? Is the experience recorded in a nerve or imprinted on a mind-structure ? Dr. Prince decides in favour of the neural hypothesis, and his objection to the postulation of a transcendental soul beyond experience is familiar and intelligible. At the same time the theory of a neural registration seems inadequate to explain the facts. It might account for a faithful reproduction of the original experience, but it is extremely difficult to understand how it could effect a *transmutation* of this. The neurons connected with an auditory experience might reproduce its facsimile, but how could they transmute it into a visual form ? On the other hand, the transmutation of an experience is much more intelligible if we suppose the experience to be recorded in some central consciousness which could apprehend the experience in all its aspects, and reproduce it in any of them. Memory is indeed an element essential to a self, but it is impossible to find a place for it in any theory which seeks to make the self a mere succession of ideas. This difficulty, however, disappears if we accept the doctrine of the registration of experience. It may be a question, no doubt, what the register is and where it is situated; whether it is physical or mental; whether the engrams are imprinted on a brain or on a soul. But a merely physical registration lets in at once all the objections to any physical theory of mind. These have been already dealt with, and need not be repeated. On the other hand, if we declare for mental registration, though we are unable to prove strictly the existence of the register, yet this is supported by a body of massive probabilities, and certainly explains far more difficulties than it raises. Notably it accounts for that capacity for modification by experience in which the whole possibility of the soul's development lies. Every thought, every emotion, each act of indulgence or self-restraint, all moral and intellectual action, leaves its record on the soul. Dealing with the physical counterpart of this process, James says:

“ We are spinning our own fates, good or evil, and never to be undone. Every smallest stroke of virtue or vice leaves its never so little scar. The drunken Rip Van Winkle, in Jefferson's play,

excuses himself for every fresh dereliction by saying, 'I won't count this time!' Well, he may not count it, and a kind Heaven may not count it; but it is being counted none the less. Down among his nerve-cells and fibres the molecules are counting it, registering and storing it up to be used against him when the next temptation comes. Nothing we ever do is, in strict scientific literalness, wiped out."¹

But while nerve cells and fibres perish with all their store, the reactions of the self to experience are imprinted on the soul, and will endure. Be it good or bad, the harvest will be faithfully garnered: none of it will be lost. Righteousness will assuredly reap its inevitable reward; wrong may be lived down, but it cannot pass away unrequited.

But though the soul is an independent psychical reality, it is closely interwoven here with its physical vehicle, which plays a highly important part in the production of the self, of which, indeed, it is a prominent portion. For it is only through this vehicle and subject to its conditions that external stimuli can reach the soul. It is seldom fully realised how largely the soul in this way is at the mercy of the body. The powers and capacities of the soul are its own, but the bodily structure in which it works condition or even transform them. Its psychical existence is independent of any brain, but only through a brain can it, here at any rate, be manifested. An injury to the brain obviously damages the whole physical machinery of mental action; and, though the connection between mind and brain is sufficiently mysterious, we accept the mental incapacity which follows such an injury without much surprise. But there are subtler and more secret influences within the body which have far-reaching mental effects. For instance, the soul may be endowed with all the capacities of genius, but if the thyroid gland fail in its secretions, the self will be the self of an idiot. The character is affected far more profoundly than is popularly supposed by the nerves, the secretions, and the general metabolism of the body. The same nervous system conjoined with a different digestion would produce a different, perhaps a widely different, character. Sometimes these physical influences may bear strange fruit. Bodily health does not always

¹ *Principles of Psychology*, i., 127.

make for mental vigour, and, as Mr. Punnett reminds us, our very toxins may serve to bring out our higher qualities.

"It is not at all impossible that a particular form of mental ability may depend for its manifestation, not so much upon an essential difference in the structure of the nervous system, as upon the production by another tissue of some specific poison which causes the nervous system to react in a definite way."¹

In conclusion, we may here take note of a scientific objection which has been taken to the existence of an independent soul—namely, that such a soul, endowed with the power ascribed to it of acting on matter by volition, would involve an interference with the physical law of the conservation of energy.² This law declares that the physical energy of the Universe always remains a constant quantity which is never increased or diminished, and that the energy of the human body must be subject to this condition. All its material changes must be simply changes in the distribution of this energy. But if it be allowed that the soul can act on the body and affect these material changes in the slightest degree, then we must suppose that the physical energy of the Universe can be augmented or diminished by energy from an extraphysical source, which would be contrary to the law. The answer to this seems to be that, as a matter of fact, physical energy can be *guided* without any increase of the energy, that the *direction* of a moving body may be changed without increasing or diminishing the rate of motion.

"A force or stress applied to a moving body along a line of direction strictly at right angles to the path of its motion deflects the path of the body without doing work, without diminishing or increasing its rate of movement, and therefore without altering its momentum or kinetic energy."³

To take a simple instance of this principle, the cushion of the billiard-table expends no energy in deflecting the billiard-ball which strikes it, nor does the rebound of a ball from the ground involve any loss of energy by the latter. A very similar action is shown by the ferments. These rather mysterious substances are able to set up vast chemical

¹ *Mendelism*, 166.

² See Chapter II.

³ McDougall, *Body and Mind*, 212.

changes without any expenditure of energy on their own part. They do not enter themselves into the reactions which they provoke, nor are they destroyed or even affected by their own activity.¹ They seem to act as a trigger which liberates energy stored up outside itself; for there is no definite relation between the quantity of the ferment and that of the substance fermented. Yeast, for instance, can ferment something like a thousand times its own weight of fermentable substance.² Accordingly, if we regard "guidance" in this connection as the influencing of activity without work, the direction, but not the generation of energy, it seems quite possible that some psychical influence may be able to guide the distribution of energy in the world without interfering with the physical law.

The conclusion which we have now reached as to the character and constitution of the soul, though it cannot pretend to be free from difficulties, seems on the whole to be open to fewer objections than the other theories which we have examined. In face of the failure of all empirical theories of the soul, we seem forced to look upon it as a permanent transcendental something in the background, and the self as its manifestation for the time being. But though we are bound to regard the soul as an independent reality, we can only make it an intelligible reality by regarding it also as extended in space. Theories which treat the soul as purely spiritual shut their eyes to this difficulty, but cannot escape it, and their definitions are usually little more than a juggle of words, which may satisfy the ear, but have no meaning for the intellect. Mr. McDougall, for instance, describes the soul "as a sum of enduring capacities, for thoughts, feelings, and efforts of determinate kinds."³

But how is it possible to conceive of a "capacity" existing by itself, not in space, and unattached to anything existing in space? It is true that on a question like this no one can afford to be dogmatic. It may be, perchance, that the soul is spiritual and belongs to a realm of existence distinct from that of the body, with which, nevertheless, it interacts. But if so, the path of inquiry is closed to us

¹ Reynolds Green, *Fermentation*, 13.

² Fischer, *Bacteria*, 109.

³ *Body and Mind*, 365.

for ever, and speculation as to the soul becomes not only worthless, but impossible. We shall strive in vain to apprehend the nature and properties of something which falls into no category of human thought, and cannot be described in human language. We may express a verbal belief in a soul which has no extension, but the concept, if it can be so called, is devoid of all colour and content. We postulate, it is true, an unextended Power at the source of things, but this postulate, which is a necessity of thought for the creative origin, is not a necessity for the things created. Indeed, in the case of the human soul it is a hindrance, not a help. The idea of an unextended soul conflicts with any intelligible conception of personality, with the interaction of body and mind, with the phenomena of memory, and with the continuous though varying unity of the self. It conveys no meaning, it explains no fact; and, so far as our immediate human experience is concerned, that which means nothing is nothing.

CHAPTER XVIII

THE UNITY OF THE SOUL

IN the last chapter we have considered the reasons which entitle us to suppose that the soul is an independent reality, capable of acting on, and being acted on by, the body, and the permanent substratum of that which is manifested as a self. But is it also a unity? Till comparatively lately the answer to this would have been an unhesitating affirmative; but recent investigations into the mysterious phenomena of multiple personality have raised a cloud of new doubts about the question. For in these cases we find two or more totally different selves manifesting themselves in turn in the same body.¹ These changes of personality are usually accompanied by physical changes also. Thus, the case of Alma Z., studied by Dr. Osgood Mason and quoted by Dr. Sidis, was that of a girl who up to the age of eighteen was physically and intellectually pre-eminent among her companions. Then there came a breakdown from overwork, and an entirely different self began to appear intermittently.

“Instead of the educated, thoughtful, dignified, womanly personality, worn with illness and pain, there appeared a bright, sprightly child personality, with a limited vocabulary, ungrammatical and peculiar dialect, decidedly Indian in character, but, as used by her, most fascinating and amusing.”²

“Twoey,” as this new personality called herself, was *entirely free from pain*, and was much concerned for the welfare of the normal personality, whom she called “No. 1.”

¹ The reader may be referred to Binet's *Alterations of Personality, Multiple Personality*, by Sidis and Goodhart, and Milne Bramwell on *Hypnotism*, 379 and *sqq.*, among many other books which deal with the subject.

² *Psychology of Suggestion*, 132.

Usually Twoey was only to the fore for a few hours, but occasionally she would remain for several days. Later on, Twoey gave way to a third personality, which described itself as "the Boy," and was also much interested in "No. 1." In other cases it may be noted that the subsidiary personalities, or some of them, are bitterly hostile to the normal self. One of the most remarkable of the older cases is that of Louis Vivé—usually referred to as Louis V. He was a hysterical epileptic, a vagrant, and a thief. At the age of eighteen, while in a house of correction, he got a fright from a snake which brought on convulsions and paralysis of the legs, but at the same time completely altered his character. He became amiable, honest, and industrious, and for three years he worked at tailoring in an asylum. Then another convulsive seizure took place, at the end of which his paralysis disappeared, and his old brutal, gluttonous, and dishonest character returned, leaving him with no memory of his life of the three preceding years. In all he displayed about six different selves. It was a peculiarity of his case that when the right side of his body was partially paralysed his character was mainly that of his evil life. The paralysis, however, could be shifted, by the application of metals, to the left side, and then he resumed his amiable and correct behaviour.¹ Whenever any of his previous states returned, they were always accompanied by the appropriate bodily conditions. A great many other similar cases will be found in the authorities to which I have referred, and elsewhere. In these cases, when there is a reversion to a previous personality, the life of that personality is usually picked up at the exact point where it was left; sometimes even a sentence left unfinished by the previous personality will be completed when the reversion to this personality takes place.

Now, it should be observed that this subsidiary personality often knows and remembers the thoughts and general life of the normal personality, but the latter, as a rule, has no knowledge or remembrance of the life of the former. Thus, "No. 1" had no direct knowledge whatever of

¹ It would be interesting to know in this connection whether he was right-handed or left-handed (see Chapter III.).

"Twoey's" life or thoughts, and only became acquainted with them through information given, and from letters of advice and so forth which Twoey would write and leave for her. So, too, with Felida X.¹ In her normal state she was gloomy, hysterical, indifferent to everything, and greatly afflicted with pain. One day she was seized with a sudden pain in her head, which was followed by a deep sleep. She awoke from this a bright, vigorous woman, keenly interested in things around her and entirely free from pain. In the latter state she retained all her memories, but on relapsing into her invalid condition she had no recollection of her cheerful personality.

Now, this very same peculiarity is often found to exist as between the normal or primary and the hypnotic or secondary selves²—that is to say, the hypnotic self is acquainted with all the life of the normal self, but the normal self retains no recollections of the hypnotic self. The obvious inference is that a subsidiary personality is in some way akin to a hypnotic self, or at any rate springs from the same source. Both the subsidiary and the hypnotic self, in fact, originate in the secondary or subliminal consciousness.

We have seen (Chapter XVII.) that any particular self is the manifestation of the soul's response to some particular set of stimuli. The primary self, therefore, of any man is the sum total of the qualities of the soul which emerge into activity in response to the normal stimuli of his environment. Any subsidiary self is a similar response to a different set of stimuli. This does not mean, of course, that the normal self changes with every change of environment. On the contrary, every healthy organism has large powers of adapting itself to new circumstances without loss of its integrity. No ordinary man, for instance, would lose his identity by being transplanted from the Equator to the Arctic regions, though the change might involve severe physical suffering or even death. It only means that some change in the stimuli which reach the soul is a necessary condition to any alteration of the self.

¹ See Binet, *Alterations of Personality*, 8. Jastrow, *The Sub-conscious*, 377.

² See Chapter III.

How, then, can such a change in the stimuli be effected ?

In the first place, it might result from a change in the environment, though, as above pointed out, the organism's power of adaptation is generally sufficient in such a case to preserve the identity of the self.

Secondly, it might be brought about by a derangement of the machinery by which the stimuli of the environment are transmitted to the soul. The origin of the new personality, on this view, must then be sought in some physical or physiological alterations in the nervous machinery of the brain, and Dr. Sidis has put forward an interesting theory as to how such alterations may be brought about. Full details of this will be found in his *Psychology of Suggestion*, chap. xxi., and his *Multiple Personality*, Part I., chap. ix., but a shorter and simpler account will serve our present purpose.

The alterations referred to take place in the nerve-cells, particularly the nerve-cells of the brain. Under ordinary circumstances every nerve-cell throws out a large number of filaments, or "processes" as they are technically called, which in their turn throw out other branches or fibres. Consequently, the nerve-cell becomes surrounded by a sort of network of fibres, which in the aggregate are larger than the cell itself. The nerve-cell and its various processes are collectively called a neuron. Now, each nerve-cell, with all its filaments and fibres, is a complete and *independent* unit. It has no *anatomical* connection with any other nerve-cell; and, accordingly, the combinations and associations which are found between nerve-cells are functional, not organic.

"The processes coming out from different nerve-cells do not fuse with processes coming out from the nerve-cells, but rather interlace and come in contact, like the electrodes of a battery in forming the electric circuit."¹

This sort of combination may be roughly likened to that formed in a mass of Virginia creeper by its intertwisting tendrils. The delicate fibres which terminate the processes of some nerve-cell come in contact with other nerve-cells or their processes, and by degrees a group is formed

¹ *Psychology of Suggestion*, 209.

with a definite physiological activity of its own. This, of course, is the physical side of the matter, and constitutes the growth of the mechanism by which the stimuli of the environment are presented to the soul. But corresponding to this physiological activity of the brain there will be an appropriate psychological activity in the soul. As the process of association spreads and develops, "the groups" (to use Dr. Sidis's terms)

"are organised into systems, the systems into communities, the communities into clusters, the clusters into constellations";

and with each advance of physiological complexity there will be a corresponding advance in the complexity of the psychological response. Naturally, however, as the combinations of nerve-cells become more complex, they also become more unstable; and "in the very highest constellations the instability is extreme, and there is going on a continuous process of variation." These highest constellations would be most susceptible to the stimuli of the environment, and would be the first to break up under an undue strain. The overstraining stimulus may be of an external or internal nature—a poison, a blow, or an emotion—but under its stress a process of disaggregation sets in, and the highest constellations are the first to give way. The fibres and filaments by which they are held together begin to retract, and the constellation breaks up into its constituent clusters. If the disintegrating process continues, the clusters may break up into communities, the communities into systems, the systems into groups, and finally the groups may be dissolved into the original isolated nerve-cells once more. These cells, however, with their processes, remain organically sound, and if the cause of the disintegration be removed they have a tendency to build up again their old associations. If this be successfully achieved, the old psychic capabilities are also regained.

On this view we may suppose that a new self might appear if a certain number of combining fibres were retracted or loosened, and that the normal self would reappear if the old association were re-formed. It would probably be re-formed, however, in a less stable manner,

and would consequently be peculiarly liable to re-dissolution. The various selves, therefore, would represent the different responses made by the soul to the different stimuli presented to it under this dissolution of the cerebral machinery, but the integrity of the soul would remain untouched. New qualities and new combinations of qualities might rise from its hidden depths in response to the challenge of these new impulses, but the capacity for manifesting them was always latent in the soul. The soul, therefore, is not a combination of different selves, but a unity which is none the less a unity because it has the potentialities of many aspects, and can manifest itself in the guise of diverse selves.

So far we have dealt only with alternative or successive selves; but occasionally a subsidiary self is found existing *concomitantly* with the primary self, and this is a much more difficult case to interpret. The most notable instance of a concomitant self is furnished by the well-known case of Miss Beauchamp, described by Dr. Morton Prince in his book *The Dissociation of a Personality*. The story is one of entrancing interest, but it is only possible here to give it in the briefest outline. Miss Beauchamp when she first came under Dr. Prince's care was a highly neurasthenic subject, and in course of time three different personalities appeared in her. These were named respectively B. I., B. III., and B. IV. Her personality would change often from hour to hour, and with each change her character became transformed and her memories altered. B. I. was cultivated and intellectual, but somewhat proud and reserved, and almost morbidly moral and religious. In the course of his medical treatment of her Dr. Prince had recourse to hypnotic suggestion, and to B. I. when hypnotised he gave the name of B. II. After a while some peculiarities in the conduct of B. II. made him suspect the presence of a different personality altogether. His suspicion proved correct, and in due course B. III., or, as she subsequently called herself, "Sally," appeared. Sally was a complete contrast to B. I. She enjoyed rude health, and was full of fun, vitality, and mischief. Later on another personality, B. IV., came on the scene. She was proud,

selfish, and dictatorial, but with much more strength of character than B. I. Dr. Prince ultimately satisfied himself that Miss Beauchamp was distinct as a unity, a single consciousness, up to the summer of 1893. At that time there occurred a psychical catastrophe which produced a disintegration of consciousness, by which the personality changed and she developed into B. I.—the form in which he first became acquainted with her. This form she retained, except when suppressed by the invasions of Sally, till June 7, 1899, when B. IV. suddenly appeared. This personality apparently belonged to the earlier period of Miss Beauchamp's life which preceded the catastrophe of 1893, and the interval between 1893 and 1899 was unknown to her.

B. I. knew nothing directly of any of the other personalities.

B. II. knew B. I. only.

B. IV. knew nothing of any of the previous ones directly.

B. III. (Sally) knew all about B. I. and B. II.; but while she knew everything that B. IV. *did*, she did not (originally at any rate) know her *thoughts*.¹ Moreover, though she was conscious, as Dr. Prince says, of B. I.'s inmost soul to the extent of sharing all her *thought-knowledge*, she did not possess B. I.'s *acquired* accomplishments, such as French, shorthand, etc. In the lives of the other personalities there were gaps representing the periods when they were off the stage—when they were “dead,” as Sally put it—but Sally's existence ran on continuously and concomitantly with them all. She was never “dead.” Her mental life was made up of thoughts and feelings entirely different to those of B. I. and B. IV., and which coexisted separately from the thoughts and feelings of whichever of them was on the stage for the time being. Thus she could attend or not as she chose to what B. I. was reading. However the other personalities might shift and change, Sally was a personality concomitantly with each of them. Dr. Prince suggests that the three might be described respectively as the Saint, the Woman, and the Devil. B. I. is the Saint,

¹ Subsequently she succeeded in getting at them occasionally by an elaborate device of her own.

closely resembling the typical saint of literature. B. IV. is the Woman, with all the frailties of temper, self-concentration, ambition, and self-interest, of the average human being.

"Sally is the Devil, not an immoral devil, to be sure, but rather a mischievous imp, one of that kind which we might imagine would take pleasure in thwarting the aspirations of humanity. To her pranks were largely due the moral suffering which B. I. endured, the social difficulties which befell B. IV., and the trials and tribulations which were the lot of both."¹

It is impossible to do justice here to all the feats and escapades of this extraordinary being. She disliked and despised B. I., whom she described as "a stupid chump," and lost no opportunity of teasing and annoying her. She sent her snakes and spiders, which B. I. detested, by post. She smoked cigarettes because B. I. disliked smoking. She would drive out several miles into the country, and then, turning to B. I., leave the latter to toil back, worn out and exhausted, on foot. Two days after one of these walks B. I. was still extremely fatigued.

"Then suddenly changing in my presence to Sally, this personage appeared perfectly fresh and unaffected by the walk. Then changing back to Miss Beauchamp, the fatigue returned with the change of personality."²

She used to make B. I. tell ridiculous falsehoods, and get her into various unpleasant situations with her friends. She would sew up B. I.'s clothes at night, so as to make her late in the morning. She resented Dr. Prince's attention to B. I., and tried to persuade the latter that he disliked her. She used to write letters to B. I. to frighten and annoy her. Here are some specimens:

(1) "I have such good news for you, my dearest Chris [B. I.]. Just fancy, Z—— knows where there is a whole colony of lovely, cool green snakes—little slippery, sliddery ones, you know—and I'm going to get them to amuse you at night and keep you from dreaming of your dear ——. Aren't you glad? But I know you're not the least bit grateful—but you will be before we have finished our course together. Do you smart to-day awfully? It is good for you, you know. You must always remember that, Chris dear. I enclose a stamp for you too."³

¹ *Dissociation of a Personality*, 17.

² *Ib.*, 162.

³ *Ib.*, 166.

(2) "If you do not write Nan immediately—this very day—I shall, and I give you fair warning that I shall entertain her at your expense—not a difficult thing, you know, and it would please her immensely, I am sure. Also, I do not approve of the blue book, and shall sew up your skirt again if you read it. Remember."¹

(3) "How awfully amusing you are, my dear, with all your shifts and evasions; but you cannot escape me so. You are to do just *exactly what I tell you concerning Z*——, and, moreover, you are to do it at once. I simply won't have this nonsense about B——. You *shall* love J—— always and for ever, or if you don't you ought to and you shall. I will make you—just make you—you wicked, wicked girl! Do you want to be all bluggy and wear the sack again? One would certainly think so, and if it comes to it I won't deny you. You may have until evening to consider, and *then*, 'Oh I'm sorry for Mrs. Bluebeard, sorry to cause her pain, But a terrible spree there's sure to be when I come back again,' if you haven't done as I told you. There is none to help you—no, not one. We all hate you. Only sometimes occasionally one pities you a little for being such an idiot and tries to help you, but it is useless. My way is better. B—— is a goose, and so is ——."²

No wonder, under this sort of persecution, that Miss Beauchamp—*i.e.*, B. I.—writes:

"Oh, Dr. Prince, save me from her, from myself, from whatever it is that is so absolutely merciless! I can bear the 'sack,' 'discipline,' anything that is physical—but not the mocking of this devil. You cannot imagine the torture I have endured in these few months—no one could."³

On one occasion Miss Beauchamp had been invited to spend Christmas with a friend, whereupon Sally, who rather fancied the invitation for herself, turned up, and robbed B. I. of her entertainment. On the other hand, Sally was not altogether bad. Except where her own amusements or special desires were concerned, she was ready to protect and take care of B. I. On one remarkable occasion when B. I. was delirious, Sally, who kept alternating with her, was perfectly sane, and rather pleased than otherwise with the state of affairs.

"The two personalities, the delirious and the sane, kept spontaneously disappearing and alternating with each other. Sally even agreed to act as nurse, and to 'come' at intervals and take the prescribed food which delirious Miss Beauchamp refused."⁴

¹ *Dissociation of a Personality.*

² *Ib.*, 166.

³ *Ib.*, 167.

⁴ *Ib.*, 115.

It would be difficult to find a more striking instance of the coexistence of two personalities in one body.

On another occasion, when B. I., in despair, tried to suffocate herself with gas, Sally "came," turned off the gas, and opened the window. B. I. was absent-minded and careless about money, so Sally promptly put her on a small allowance. She also sent some of B. I.'s books to a storehouse for safety. Moreover, Sally took a lively interest in Dr. Prince's study of the different personalities, and kept him informed as to what went on in "the family," as she called it. It was she, in fact, who gave him an all-important clue to the mystery by discovering that B. I. hypnotized and B. IV. hypnotised were the same person. About this Dr. Prince writes:

"I was in the act of giving B. II. some suggestions about sleeping, when suddenly Sally bounced out and exclaimed excitedly, 'Oh, Dr. Prince, I came to tell you that I think the Idiot¹ hypnotised is the same person as B. I. hypnotised, for I know the Idiot's thoughts when she is asleep just as I do B. I.'s then. I may be wrong, but I think so.'"²

The following day (November 6, 1899) she reasoned the matter out exceedingly well in a letter to Dr. Prince; but her high spirits were irrepressible, and even this comparatively serious letter was headed: "*'Tis the voice of the lobster.*"

Sally could not understand why B. IV. had no knowledge of the Beauchamp life between the crisis in 1893 and June 7, 1899, and accordingly dubbed her "the Idiot." Nevertheless, she found her much harder to deal with than poor B. I., and had desperate battles with her for the mastery. As soon as B. IV. had gone to bed, Sally would "come," throw the bedding on the floor, and pile furniture upon the bed. Once B. IV.

"awoke to find herself perched upon a shaky structure composed of a couch, two chairs, and a dress-suit case. She was stark naked, and in an attitude as if posing for a statue. Her limbs fixed, as if by some occult power, unable to move hand or foot, she was entirely helpless save for the power of speech."³

Again, Sally would torment her with all sorts of hallucinations, and finally took to physical violence, scratching

¹ Sally's name for B. IV.

² *Ib.*, 267.

³ *Ib.*, 484-5.

B. IV.'s arms with some sharp instrument, and then rubbing alcohol and lemon-juice into the wounds.¹ Angry or sarcastic letters also passed frequently between these two personalities. As all the battles took place in the common body, it can easily be imagined what a wreck this became.

We cannot, however, pursue this fascinating history any further, and we must turn to consider whether the existence of a concomitant personality like Sally is compatible with a belief in the unity of the human soul. If the self is to be regarded as the manifestation of the soul in response to the stimuli of its environment, can there be two simultaneous manifestations? Dr. Prince has promised us a full exposition of his own theory of the Beauchamp case in another volume, and until this appears a discussion of his standpoint would be premature. He seems, however, while treating the various personalities as dissociations of a consciousness, to consider that they may nevertheless have a physical or physiological origin.² He describes Sally as a subconsciousness, and he limits the meaning of this term to a state which actually coexists with the primary consciousness, and which is therefore an extra, co-acting mind, of which the primary self is not aware. It does not, in his usage, include any dissociated state which does not also coexist with the primary consciousness.³

Now, in order to make such a coexistent personality possible, two distinct sets of stimuli must somehow be presented to the soul concomitantly.

It has been shown above that a difference of stimuli sufficient to evoke a new personality may be induced (1) possibly by a change of environment, though (2) more probably by a derangement of the nervous machinery. There is, however, a third cause to be reckoned with—namely, the selective power of the consciousness itself. It must be remembered that under no circumstances do *all* the stimuli of the environment receive attention. A selection is made between them, and to this selection alone the soul responds. How the selection is made is an obscure

¹ *Dissociation of a Personality*, 486.

² *Ib.*, 149, 193, 283, 300, 305.

³ *Ib.*, 529-30.

question, but of the fact that it is made there can be no doubt. To regard consciousness as something purely cognitive is to misapprehend it altogether. It is rather, says James, "a fighter for ends"; and, as such, its cognitive powers are made subservient to these ends, discussing which facts further them and which do not. Primarily, therefore, consciousness is a selecting agency.¹

So, too, Dr. Sidis says:

"The primary self, being an active self-conscious synthesis, is *selective* in its nature. Out of a number of sensations, ideas, and feelings the activity of the primary self selects only some, and leaves the rest in the background of consciousness. The primary self has its more or less definite, determinate outlines that constitute its personal character. Only material of a certain kind and quality, only² moments-content and moments-consciousness of a definite character, fitting into the form activity of the self; only such material is taken up within the circle of its experience; the rest of the material is simply ignored."³

Every self, therefore, is a response of the soul to certain selected stimuli; and it is possible that this selection may depend on the *part* of the soul upon which the stimuli impinge. We observe a similar basis of selection in the physical body. The ether-waves which give light to the eye fall without appreciable effect on the hand. The air-waves which produce sound in the ear are altogether ignored by the optic nerve. And the other senses, in like manner, attend only to their own selected sets of stimuli.

May not, then, an analogous system obtain in the soul? In the course of its development the soul has passed through a vast and varied experience, which must have endowed it with equally varied possibilities of response. These possibilities would naturally be grouped together according to some sort of affinity, and such grouped constituents of the soul's structure may be conveniently described as *parts* of the soul. The normal self of a living individual is a manifestation of the soul, but obviously not of the *whole*

¹ *Principles of Psychology*, 139, 141.

² A moment-content is the name given to the bare psychic contents of the mind—sensations, ideas, emotions for the time being: a moment-consciousness represents this new material consciously apprehended and synthetised into an intelligible whole.

³ *Psychology of Suggestion*, 228-9.

soul. It represents the response of one or more of such parts, but there may well be countless others lying dormant, and only waiting the touch of some appropriate stimuli to waken them into activity.

Now, in the case of a dislocation of the nervous machinery for stimulation, one of two things might happen: (1) The stimuli themselves might be reduced in number or power, but still be transmitted to the same part of the soul. In this case the response of that part would be weakened or narrowed, but the self would still be the normal self. It would be an impoverished or restricted self, but not a new self: and this is just what we see where the intellect is weakened by disease or injury of the brain. Or, (2) the stream of stimuli, instead of being choked and weakened, might be diverted to a different part of the soul altogether—a part which might select an entirely different set of stimuli for attention and response; and in this case a *new* self would emerge. This, however, would be an alternative or alternating, but not a *concomitant*, self; and in order to produce the latter it seems necessary to suppose that some *division* of the stream of stimuli may be brought about by the dislocation of the nervous machinery. One of such divisions would be represented by an appropriate primary self, while the other would be represented by a concomitant subconsciousness such as Sally. This concomitant subconsciousness must, of course, be sufficiently developed to function as a self, but we should not expect it to be as perfectly equipped in all its details as the older consciousness. This expectation was fully realised in Sally, whose personality was defective in many such respects. For instance, the primary consciousness retained control over the motor centres of the brain, and, save under exceptional circumstances, Sally, as a *subconsciousness*, did not possess the use of the limbs or body, or the faculty of speech.¹ To enable her to use these she had to oust the personality at the surface for the time being, and take its place as an *alternating* personality. In this case the ousted personality did not persist as a concomitant subconsciousness, but was temporarily wiped out.² She wrote a great many letters,

¹ *Dissociation of a Personality*, 155.

² *Ib.*, 144.

but they were all in the handwriting of B. I.¹ Again, she was strangely anæsthetic; she was never hungry or thirsty, she was entirely free from bodily discomfort, pain, or ill-health; and, though the other personalities often felt the effect of her exertions, she did not herself know the meaning of fatigue. Sensation could be given to her temporarily by suggestion, and when she discovered this she used to procure it for herself by auto-suggestion.² Moreover, she always insisted that her body was not her own, and formed no part of her.³ She had considerable powers of willing and hypnotising the other personalities, and producing positive and negative hallucinations in them.⁴ She could be hypnotised herself, but, unlike a normal personality, she remembered her own hypnotic states. When the other personalities increased in vigour, Sally complained that she felt "squeezed"—as though there were a contraction of the path through which the stimuli which evoked her existence could pass to the soul. In the remarkable Autobiography which she wrote for Dr. Prince, she declared that she remembered herself as being, from early infancy, a distinct personality from B. I. According to her, B. I. used to have visions when she was a tiny thing, while she (Sally), though she did not have the visions, was aware of them. So, too, during this period, Sally was often angry when B. I. was not. These two queer little personalities would think about the same things at the same time, but think differently about them. In adult life similar distinctions between Sally and B. I. and B. IV. persisted and became accentuated. By appropriate suggestion it was found easy to amalgamate the experiences of B. I. and B. IV. but Sally's experiences could never be amalgamated with those of either of the others.

And yet one fact proves almost conclusively that Sally really sprang from the same source as the others—namely, the fact that when she thought deeply on intellectual subjects, subjects which belonged to the primary consciousness, she tended to change into B. I. or B. IV. But, though springing from the same source, it seems probable

¹ *Dissociation of a Personality*, 106, 561.

³ *Ib.*, 489.

² *Ib.*, 148.

⁴ *Ib.*, 284, 429.

that, for Sally, this source must have been tapped at a lower level than that of the other personalities. She appeared to emerge from a deep state of hypnosis, and this, perhaps, may indicate that she represented some deeply buried constituents of the soul.¹ Perhaps, too, it may suggest the explanation of her coexistence in such comparative isolation. The part of the soul represented by the primary consciousness, in the two phases B. I. and B. IV., lay so far away from that represented by Sally that, under ordinary circumstances, coexistence became possible without fusion or clashing. But the part of the soul representing Sally, with its cerebral counterparts, may well have been imperfectly organised for the higher intellectual functions. Accordingly, when she attempted these, there would be a tendency for the psychical energy to seek the paths better trodden by the primary consciousness, or to use the better mechanisms which this had fashioned. In such a case the Sally personality would fade out, and the primary personality would come by its own again. Sally, in fact, seems to have been a specially organised consciousness which, however, revealed its subliminal origin by some significant tokens. Thus, as above mentioned, she remembered her own hypnotic states. Again, she insisted that she never slept—another peculiarity of the subliminal consciousness. Dr. Prince is not prepared to admit her claim fully, but he finds reason to believe that she was awake, partly at any rate, while the other personalities slept. Like the subliminal consciousness, she had a marvellous memory, particularly for details—like a child; but, on the other hand, she had a very imperfect sense of time, which, however, the subliminal consciousness certainly possesses.² Dr. Prince says that she simply could not compute it.

“A day, a week, a month are almost the same to her. Things happened ‘a short time ago,’ or ‘a long time ago,’ in her calendar. But even these expressions do not connote the same ideas to her as

¹ It is curious to note that sometimes, when suggestions were being made to B. I. or B. II. contrary to Sally's wishes, the latter would shout refusal from her subconscious depths in a bass voice (*Ib.*, 157).

² Meyers, *Human Personality*, Abridged Edition, 69.

to the rest of us. One year is the same as ten years; ten seconds as ten minutes. Ask her to guess a minute and she is as likely to call time at the end of ten seconds as five minutes."¹

Sally, in writing her Autobiography for Dr. Prince, referred to an incident as having happened "a few days ago." "*Months*, Sally," interjected B. IV., who had suddenly emerged to correct her.

This defective sense of time is very curious, and by no means easy to explain. It is difficult to understand why a subsidiary personality should be conspicuously lacking in a quality which the subliminal consciousness from which it springs possesses in rather a high degree. Possibly we may gather a hint at the explanation from M. Bergson. He tells us that instinct is not only earlier in point of evolution than intellect, but has also a closer and truer apprehension of reality. To instinct, time, like motion, is an undivided whole, a continuous flow of duration. The divisions into which we cut up this continuous whole are merely devices of the intellect to make it more tractable for human purposes. Adopting this supposition provisionally, may there not have been in Sally a strain drawn from some deep level of the Beauchamp soul which was nearer akin to that primitive instinct—the instinct which takes time as a whole—than to the intellect of later evolution which subdivides duration into periods of time? And herein, too, we may perhaps find some explanation of the strange childishness; for, with all her brightness and cleverness, she was in character essentially a child. She had a childish credulity, a child's ignorance of the world, and her attitude towards her surroundings generally betrayed a childish immaturity. She was easily angered, easily flattered, and, in spite of her impish love of mischief, easily moved to sympathy with the sorrows or troubles of others—except those of the hated and despised B. I. And, notwithstanding a decided blend of intellectual and logical power, her nature responded to instinct and impulse rather than to reason and moral purpose. She may have represented, in fact, a much earlier stage in the evolution of the Beauchamp soul.

¹ *Dissociation of a Personality*, 150-4.

One cannot repress a feeling of regret that this interesting personality had to be suppressed—or, as she put it, “sent back to where she came from”—in the process of rebuilding Miss Beauchamp’s shattered self, but obviously, under the circumstances, this was a necessity.

In conclusion, we may just glance at a possibility which must have occurred to many readers of Dr. Prince’s book, and which may even have crossed his own mind. Could Sally have been a foreign invading consciousness—human or quasi-human—which broke through the weak defences of Miss Beauchamp’s mental citadel, and acquired a partial dominion over it? At first sight this might seem the most obvious explanation, but a closer investigation of the facts will dispel the idea. Her tendency, already noticed (p. 240), to change into B. I. or B. IV. whenever she thought deeply on intellectual subjects, shows that she had a fundamental kinship with the primary personality which could not belong to an alien invader. Other facts point to the same conclusion. For instance, suggestions given to Sally when hypnotised influenced B. II. (B. I.’s hypnotic state).¹ Nay, more, in spite of the deep distinctions of character between them, Sally’s pleasure sent a faint thrill of enjoyment through B. I.² Again, if Sally dwelt on the thoughts of B. I. or B. IV. (after she had found how to get at them), she usually changed into the personality to whom the thoughts belonged.³ She had, moreover, a horrible remembrance of the psychical catastrophe to Miss Beauchamp, which an invading consciousness would not be likely to apprehend, and certainly would not take seriously to heart.

Facts like these really preclude us from seeing in Sally an obsession by an outside consciousness. She was a self, but not an independent soul, and she belonged to the same soul as the other Beauchamp personalities. Her co-consciousness, however diverse from the other selves, sprang from the same centre which served for them all, and of which they were all partial aspects. Consequently, though she reveals some of the uncanny possibilities of manifestation belonging to the soul, she does not disprove its essential unity.

¹ *Dissociation of a Personality*, 139.

² *Ib.*, 62, 139.

³ *Ib.*, 221; note.

CHAPTER XIX

SEX

IN accepting the conclusion that the soul is one—a unity, not a multiplicity—we must bear in mind that the unity thus established is a quantitative unity. The soul is a structural *integer*, which, though manifested in various selves, is not built up of them: they are its products, not its architects. At the same time, this quantitative unity of the soul itself is not incompatible with certain qualitative distinctions between different souls. Most of the distinctions which we observe among human beings go no farther than the various selves by which the respective souls are for the time being represented. But between men and women there are certain distinctions which seem to sink deeper, and to abide as permanent characteristics of the respective sexes.

Primarily sex is, of course, a physical or physiological feature of organic existence, and in most of the lower forms of life it is little more. Higher up in the scale, however, traces appear of correlative psychical features, notably the maternal tenderness of most mother animals towards their young; and in the human race the psychical aspect of sex is strongly apparent. In what are called (sometimes rather vaguely) the “secondary” sexual qualities, very definite differences of character between man and woman are displayed. These cannot be ascribed, or at any rate ascribed entirely, to differences of education or of individual adaptation to a particular environment. To a greater or less extent they are ineradicably related to sex, and sex, therefore, is a definite factor to be considered in the history and development of the soul.

Having regard to the nature of the evolutionary process

through which the soul comes into existence, it cannot be supposed that each human soul was stamped, from the lowly outset of its career, with the definite impress of one sex or the other. The facts of biology alone forbid any such assumption; for the appearance of sex was much later than the appearance of life, and the humblest life involves a rudimentary element of soul.

But though sexual distinctions are a later development, not an original feature of life, they are now so closely interwoven with human life that we can hardly imagine what any human life would be without them. They are an evolutionary product, no doubt, but their evolutionary purpose is a question of some obscurity. Have they any, and, if so, what, permanent value for the course of our development? Can the distinctions of sex which figure so largely in our present life be retained in any future existence, and, if so, within what limits? Are they transient features or permanent elements of a human personality? Are they vital and spiritual, or merely physical and physiological characters of our race? These are the questions with which we must here attempt to deal.

The origin of sex is a somewhat curious story. Nowadays sex is associated chiefly with reproduction, and is regarded as part of the machinery for the perpetuation of a species. As a matter of fact, however, the process from which it sprang had no direct connection with reproduction, and aimed at the benefit rather of the individual than of the race. Reproduction in its simplest form, as it appears in unicellular organisms, is merely division. The parent cell, when it has attained its limit of growth, breaks into two halves or daughter cells, each of which possesses an independent existence. The daughter cells, in their turn, break up into other cells, and so the species multiplies. In cases of this kind the cells and the reproductive process are alike asexual, and the reproduction may be regarded simply as a growth beyond the limits of the individual organism. There is, however, another process which takes place between unicellular organisms, and which is known as Conjugation.¹

¹ An account of this process with illustrations will be found in Weismann's *Evolution Theory*, i., 366.

Essentially this consists of a fusion between two full-grown single-cell organisms which range themselves alongside of each other for this purpose, and gradually coalesce. After the union has become complete, and the two organisms are enclosed in a single cell-body, a separation once more takes place by simple division, and two new organisms are formed, between which the germ-plasms of the two original organisms are divided.

This is the process from which sex was originally evolved, but it is obviously something quite distinct from reproduction. In fact, so far from increasing the numbers of the species, its first effect is to diminish them by a half. In these primitive organisms it is not a necessary antecedent to reproduction, nor is reproduction its object. It must, of course, have a racial value, or it could hardly have survived; but nevertheless it was adopted in the first instance, not for the benefit of the race, but for that of the individuals undergoing it. According to Professor Hartog and others, this benefit consists of a kind of mutual rejuvenescence of the conjugating cells.¹ It might be supposed that the fresh vigour thus induced would, in its turn, promote multiplication, and thereby prove conjugation to be an indirect auxiliary to reproduction. But the latest experiments seem to show that conjugation does not rejuvenate in this sense.² Professor Dendy considers that the habit of conjugation probably arose from the necessity of making good some disturbance of equilibrium in the protoplasm of the cell. This incapacity might well be brought about by the repeated fissions of ordinary multiplication, under which some of the individuals so produced might have too much

‘of one constituent, and too little of another. It might even be that from the very first the inequalities of fission resulted in the accumulation of more active protoplasm in some cells and a greater amount of reserve material in others, and that this was the starting point of the differentiation into male and female.’³

Professor Dendy is inclined to ascribe the mechanism of the process to some difference of polarity between the con-

¹ *Problems of Life and Reproduction*, 18-24.

² Morgan, *Heredity and Sex*, 9.

³ *Outlines of Evolutionary Biology*, 127-8.

jugating cells.¹ M. Le Dantec goes farther, and holds that the elements of sex are in the cell from its earliest stage. He regards the cell as an agglomeration of bipolar elements, between which intracellular sexuality takes place.² Weismann, it is true, protests against the theory of rejuvenescence, but his objection seems verbal rather than substantial. For he admits

“that the fusion of individually different simple organisms must or may bring about a direct advantage—a stimulation of the metabolism, and at the same time an improvement of the constitution in different directions.”³

This he considers to have been the reason for the *first* introduction of conjugation among the lower forms of life. Indeed, it is difficult to come to any other conclusion. For the first result of conjugation is a commingling of the germ-plasms, or hereditary substances, of the two conjugating cells; and however beneficial this may subsequently prove to the race, it must first have been adopted for the benefit of the two particular cells. The ultimate advantages of conjugation to the evolution of the race have been variously explained, but we are not for the moment concerned with these explanations.

When multicellular organisms appeared on the scene, the simple method of commingling different germ-plasms by means of conjugation became impossible. Accordingly, by an application of the principle of dividing labour to which Nature so constantly resorts, the germ-cells were set apart from the body-cells, and segregated in the reproductive organs. In this way the commingling of germ-plasms has now become, in all the higher multicellular organisms, closely associated with bi-parental reproduction, but this does not affect the question of its original purpose. Following Weismann, let us call this commingling, however produced, “amphimixis,” and bi-parental reproduction “amphigony.” It will readily be seen that, though amphimixis is inevitable in amphigony, amphigony is not necessary for effecting amphimixis.

¹ *Outlines of Evolutionary Biology*, 143.

² *The Nature and Origin of Life*, 217, 227.

³ *Evolution Theory*, ii., 225.

"The significance of amphimixis," says Weismann, "cannot be that of making multiplication possible, for multiplication may be effected without amphimixis in the most diverse ways."¹

Thus, in unicellular organisms reproduction by fission of some sort without amphimixis is the ordinary rule. But even with multicellular organisms amphigony is not an absolute necessity, as is shown by the remarkable phenomenon of Parthenogenesis. Parthenogenesis is unisexual reproduction—*i.e.*, reproduction by the mother alone, and shows, as Weismann remarks,

"that even in highly differentiated animals the apparently indissoluble connection between reproduction and amphimixis can be dissolved if circumstances require it."²

Among some of the lower forms of multicellulars, parthenogenesis is found to alternate with amphigony as a mode of reproduction. The aphids, for instance, which swarm on our rose-trees produce, during the summer months, when the weather is warm and food plentiful, many generations of females parthenogenetically. But, as the weather grows colder and food more scarce, male births take place, and there is a recurrence to amphigony.³ The same peculiarity has been noticed among the crustacea and in butterflies and moths. In fact, this ancient mode of reproduction dies hard, and traces of it perhaps survive in the ovarian dermoids which occasionally occur in the human species.⁴

Again, Hermaphroditism plays an important part in many divisions of the animal and vegetable kingdoms—*e.g.*, in snails and flowering plants—thereby reminding us that even bisexual reproduction need not always be *bi-parental*—in fact, that bisexual reproduction can take place without amphimixis. Moreover, even where amphigony has been definitely established, it has been found possible to dispense with the male element in reproduction by replacing it with an artificial substitute. The male, in short, is not always a necessary factor in what should be bisexual reproduction. Dr. Loeb found that if the eggs

¹ *Evolution Theory*, ii., 193.

² *Ib.*, ii., 212.

³ Geddes and Thomson, *Evolution of Sex*, 46.

⁴ J. Bland Sutton, *Lancet*, May 25, 1912, p. 1390.

of the sea-urchin were placed in sea-water to which a certain proportion of magnesium chloride was added, they would proceed to develop in exactly the same manner as if they had been fertilised sexually. This experiment shows that in certain cases a purely chemical stimulus can take the place of the male element. Some experiments of MM. Bataillon and Henneguy have carried the matter farther still. The ova of frogs were placed in sterilised water, and pricked with a minute platinum needle or a sharp spicule of glass. In this case also a similar process of development began, and though it frequently broke down before completion, yet out of 1,000 eggs thus treated 120 tadpoles were produced, one of which practically reached the stage of a mature frog.¹ This experiment is doubly remarkable, partly for its having dealt with so high an animal as the frog, and partly because it showed that a mere mechanical stimulus could take the place of male co-operation. And this rounds up the evidence against any inherent connection between amphimixis and reproduction. Parthenogenesis shows the sufficiency of a female origin of life; the above experiments demonstrate that the co-operation of a male factor is not invariably necessary, its only purpose, *so far as reproduction is concerned*, being to supply a stimulus to the ovum. Sexual distinctions, no doubt, arose in the first instance from amphimixis—*i.e.*, amphimixis by conjugation; but amphimixis and reproduction are processes essentially distinct from each other, and while the purpose of the latter is the multiplication of the species, the purpose of the former is *communion between individuals*.

It was this need for communion, therefore, which gave rise to the process—conjugation—from which the two sexes and the differences which distinguish them were ultimately developed. But how? The single cell which multiplies by single fission has strictly no sex at all, but it is obviously more like a mother than a father, and therefore we may, with practical accuracy, describe life in this primitive form as female rather than male. How, then, does this female or quasi-female thing come to bring forth the maleness

¹ *Lancet*, May 25, 1912, p. 1391; *Nature*, June 22, 1912, p. 568.

with which it is now so sharply contrasted? We may perhaps find a clue in some of the phenomena connected with conjugation. We have seen that two conjugating cells, after their fusion, normally break up into two equal daughter cells. But Professor Hartog points out that this does not always occur, and that they sometimes break up, by means of a rapid series of divisions, into a number of daughter cells of *unequal* sizes. Midway between the unicellular and multicellular organisms stands a group, belonging to the lower Algæ, of what are called "colonial" organisms. *Pandorina Morum*, one of the simplest of these, is a colony of sixteen single cells, each of which retains a considerable amount of independence. Each cell of the combination is still self-sufficient, and can, if need be, reproduce the whole colony from itself. But, when they break up by fission, the resulting cells are of three sizes, and consequently conjugation between equal cells, or on equal terms, as we may put it, cannot take place between all of them. The members of the two smaller classes can and do conjugate on equal terms with the other members of their respective classes, but in the large class conjugation does not take place at all. In addition, however, to this limited power of conjugation, a new process appears, which clearly foreshadows biparental amphimixis. Conjugation on equal terms cannot take place between a larger and a smaller cell, but a union between them can be effected by the absorption of the smaller into the larger cell. In this case the smaller cell plays a part analogous to that of the male in amphigony. The largest cells of *Pandorina Morum* are purely female or quasi-female, and members of either of the two smaller classes can act as males to them; while the medium-sized cells can act as females to the smaller cells and as males to the larger ones. The differences between the prototypal maleness and femaleness in these cells is, in fact, a question, not of essence, but of magnitude. "We have then here a very rough attempt at sexual differentiation."¹ And "the real origin of sex is . . . the gradual differentiation of pairing cells into categories of distinct size and habit."²

¹ Hartog, *Some Problems of Life and Reproduction*, 14. ² *Ib.*, 13.

So much for the origin of sex. We now have to face the equally difficult question of its determination. What is the principle or influence which regulates the sex of the offspring? Or, as we are chiefly here concerned with the human race, what is that which determines the sex of each human child? Various explanations have been suggested, such as the time of fertilisation, the age of the parents, their comparative vigour, or the influence of nutrition. None of these, however, are entirely satisfactory, and Mendelism has recently suggested an explanation which seems to be nearer the truth. It may be briefly stated as follows:

Excluding parthenogenesis, every multicellular individual, be it plant or animal, is the product of a combination of two distinct sexual cells, the male sperm-cell and the female egg-cell. These cells are called "gametes" (pairing cells), and the individual produced by this union is called a "zygote" (the product of a yoking together). Now, the zygote is obviously a compound structure in which the constituents contributed by each of the parental gametes will remain, during the zygote's existence, linked together in partnership. But in due course the zygote will itself begin to form gametes out of its own germ-plasm, and then "the partnership is broken up and the process is reversed. The component parts of the dual structure are resolved with the formation of a set of single structures, the gametes."¹

Thus, if we suppose a zygote AB to be a combination of the gametes A and B, when AB begins to form its own gametes, the combination breaks up, and the gametes will be either pure A's or pure B's. This being the general principle, let us consider its application to specific qualities. In the case of contrasted characters, such as the tallness or dwarfness of the common pea, with which Mendel chiefly experimented, it is found that when these are united by cross-breeding one of them predominates in the offspring of the first generation to the entire exclusion of the other. This predominating character is called the Dominant; the other, which is apparently extinguished, is called the Recessive. I say apparently, because the Recessive is still

¹ Punnet, *Mendelism*, 4-5.

there, but latent, and in the next generation it begins to appear. Thus, when Mendel crossed a tall and a dwarf pea, all the progeny were tall—tallness being dominant to dwarfness. There was not, as might have been expected, a generation of *medium-sized* plants. So if a grey mouse be crossed with a white mouse, the offspring are all grey, grey in this case being dominant to white. Nevertheless, the recessive white has not been lost, and if these offspring—*i.e.*, of the first generation from the original cross—be interbred, the progeny will be grey and white in the proportion of three grey to one white. Here the recessive begins to come in sight; for these whites of the second generation from the original cross are found to be “pure” recessives—that is to say that, if interbred, they produce for all subsequent generations nothing but whites. But with regard to the grey members of the generation, one-third only are “pure” greys, while the other two-thirds are “impure” greys—*i.e.*, greys with a latent mixture of white; and if these impure greys be interbred, they produce a third generation consisting, like the second generation, of one-fourth pure greys, two-fourths impure greys, and one-fourth pure whites. The theory by which these facts are explained is that, though opposite characters are combined in a zygote, the gametes formed by that zygote *can carry one of them only*. The opposed characters are called “allelomorphs”—that is to say, they are alternative to each other in the constitution of the gamete, and where one is present in a gamete, the other is not. They are believed to be due to a definite something (or perhaps rather the presence or *absence* of a definite something) in the gamete which is called a “factor.” The characters due to these factors are called “unit characters.” Accordingly, when the zygote begins to form its own germ-cells, these divide into two equal communities, one of which carries throughout the factor, say, of tallness, the other the factor, say, of dwarfness.

And now, turning once more to the question of sex determination, the opinion is fast gaining ground that sex is not determined by environment, or parental conditions, or any external influence of a similar kind, but is an allelo-

morphic character following the above law. Dr. Saleeby, in his *Woman and Womanhood*, tells us that, among the higher animals at any rate, sex seems to be a quality originating in the *mother*. The gamete of the father (spermatozoon or sperm-cell) is always male, and wholly male; but the gamete of the mother may carry either maleness or femaleness. The mother, in fact, in forming her ova, forms them of two kinds—one bearing maleness, the other femaleness.¹ When an ovum bearing maleness is fertilised by a spermatozoon—which always carries maleness, and maleness only—the result is a male individual. If, however, an ovum carrying femaleness be similarly fertilised, the result is a female individual; for though this zygote will be a combination of maleness and femaleness, femaleness is dominant to maleness. But mark the difference between the male and female.

“The female . . . is not female all through, as the male is male all through. So far as sex is concerned, he is made of maleness *plus* maleness. In Mendelian language the male is homozygous, so called ‘pure’ as regards this character. But the female is heterozygous, ‘impure’ in the sense that her femaleness depends upon the dominance of the factor for femaleness over the factor for maleness, which is also present in her.”²

Or, as Mr. Bateson puts it,

“The female contains a factor which makes her female, but the male is a male because he is without this factor.”³

In corroboration of this view it may be noted that a female in old age, or when her ordinary female development is otherwise interfered with, begins to show some of the peculiarities of maleness. In fact, when her dominant femaleness begins to grow exhausted, the recessive male factor in her tends to assert itself. A male, on the other hand, if his normal development be arrested, may fail to develop some of his peculiar male attributes, but he never shows any signs of femaleness.

Professor Morgan arrives at a similar conclusion, though his account of the procedure is somewhat different. More-

¹ A similar hypothesis was previously advanced by Schultze.

² *Woman and Womanhood*, 75.

³ *Mendel's Principles*, 190.

over, the experiments on which he relies seem to have revealed the particular physical correlate with which the factor of femaleness is associated. Only the briefest explanation, and that only of a typical case, is here possible. The nucleus of every cell contains certain constituents called "chromosomes." These are considered to be the bearers of hereditary qualities, and one of such chromosomes is now said to have been identified as the chromosome which bears the factor of femaleness. Originally both sperm-cell and egg-cell contain the sex chromosome; but, as the result of various complicated processes by means of which the respective cells became ripe for pairing, this chromosome disappears from *half* of the sperm-cells of the male organism, while it remains in *all* the egg-cells of the female. If an egg-cell is fertilised by a sperm-cell carrying the sex chromosome, the zygote is a female; otherwise the zygote is a male. According to this theory, all the egg-cells are the same, but there are two kinds of sperm-cells. According to Dr. Saleeby, the sperm-cells are all the same, while the egg-cells are of two kinds. But each explanation goes to show that sex is determined by the characters of the particular gametes which combine to form the zygote. It is, in fact, a heritable quality like tallness or dwarfness in plants, whiteness and greyness in mice, and so forth, and follows the established laws of heredity.

In either case the arrangements obviously provide for the production of the two sexes in approximately equal numbers. What is the full evolutionary significance of this? It might seem at first sight that its purpose was simply to facilitate bisexual reproduction; but, regarded as a *factor in evolution*, this form of reproduction is more or less of an anomaly, and its very existence seems a matter of some perplexity to the learned. Professor Morgan remarks:

"If we are asked what advantage, if any, has resulted from the process of sexual reproduction, carried out on the two-sex scheme, we must confess to some uncertainty."¹

It brings about new combinations of germ-plasms, no doubt, but conjugation produces the same result. These new combinations may help individuals to adjust themselves

¹ *Heredity and Sex*, 2.

more readily to varying environments, but we cannot conclude that this process can make any permanent contribution to evolution.

"It is true that Weismann has advanced the hypothesis that such recombinations furnish the materials for evolution, but as I have said there is no evidence that supports or even makes plausible his contention. . . . Sexual reproduction might be beneficial to a species in maintaining itself, it cannot be utilised to explain the progressive advances that we must believe to have taken place during evolution."¹

But notwithstanding such criticisms on the utility of bisexual *reproduction*, bisexual *distinctions* may nevertheless have a value of their own which is wholly independent of reproduction in any form. Now, amphimixis produces new combinations of germ-plasms, and consequently of qualities, but these qualities are at first distributed indiscriminately among the members of the particular species. In the lower stages of existence this arrangement sufficed, but as development advanced it seems to have become inadequate. For we find that after sex appeared the respective sexes began to acquire distinctive qualities—*i.e.*, the secondary sexual characters above referred to. I venture to suggest, therefore, that one purpose, at any rate, of a double sex may have been *to bring about this selection and segregation of distinctive qualities*. For it has been ascertained that the sex chromosome carries, not only femaleness, but a variety of qualities which have become linked with it; and this distinctive distribution of qualities may bear directly on the future of humanity by promoting the *evolution of character*.

And here we touch the psychical aspect of the sex question. Professor Hartog, as we have seen, refers the origin of sex to "the gradual differentiation of pairing cells into categories of distinct *size and habit*." (The italics are mine.) In other words, though the distinction between male and female is originally a difference of *quantity* only, it subsequently begins to carry differences of *quality* also. The different cells acquire different *habits*, and this difference of habits in time produces difference of *character*. We should

¹ *Heredity and Sex*, 19.

naturally expect, indeed, that difference in size would sooner or later initiate a difference in habit; and this is precisely what has happened. In nearly every case the large female cell, swelled with its store of cytoplasm, becomes passive and inert, while the minute male cell—often hardly more than a nucleus with very little surrounding cytoplasm—is active and restless. These differences of habit developed in course of time into physiological differences, differences of constitution—the male constitution being what is called *katabolic*, that of the female *anabolic*.

“In phraseology which will presently become more intelligible and concrete, the males live at a loss, are more *katabolic*—disruptive changes tending to predominate in the sum of changes in their living matter or protoplasm. The females, on the other hand, live at a profit, are more *anabolic*—constructive processes predominating in their life, whence indeed the capacity of bearing offspring.”¹

In the female organism the physiological processes tend to the construction of living substance and storing up of nutrition and energy. In the more active male the processes are rather disruptive and disintegrating. There is a more rapid wear and tear, and a less persistent tendency towards repair and reconstruction.

Herein lies the physiological basis on which the distinctive qualities of the respective sexes ultimately rest. As life grew more complex, the manifestation of these characteristic differences also grew wider and more diversified; but the radical difference between male katabolism and female anabolism is the ultimate source of them all. And here Nature's principle of dividing labour would again come into play. For, as more and more specific qualities gradually appeared, it would grow increasingly difficult for Nature to combine in the same organism qualities which, though equally worth preserving, conflicted with each other. This difficulty would be disposed of by distributing them between the two sexes, so that each of the rival qualities could find expression without paralysing any of the others.

It seems, therefore, from what has been said, that sex is an evolutionary development arising out of a process (conjugation) which aims merely at a physical communion

¹ Geddes and Thomson, *Evolution of Sex*, 26.

between two cells, without any reference to reproduction. When, in due course, organisms arose too complex for conjugation, the process was necessarily abandoned between them, but Nature utilised the impulse which inspired it by attaching it to the reproductive functions in these higher organisms. Finally, as the two sexes became more definitely differentiated, sex offered her a basis for the distribution of contrasted qualities which she was prompt to employ. If this be so, we may fairly presume that, so long as these qualities are required for the scheme of evolution, the sexual division which preserves them will endure.

Mr. Havelock Ellis, in his *Man and Woman*, has collected an immense amount of valuable information on the subject of sexual distinctions. We need only note a few of the more prominent instances. Physically, the woman's body approaches somewhat nearer to the quadrupedal body, which, though of course lower in the scale of evolution, is free from many morbid and injurious conditions which have been produced or promoted by the assumption by mankind of the erect posture. Her skull is somewhat flatter than the male skull. Man's cranial capacity is absolutely larger than woman's, but, having regard to the lesser total weight of her body, it is quite possible that woman is relatively superior in this respect to man. In brain-weight the European man at any rate is superior to the woman, but here, again, similar considerations of total weight and size make it doubtful whether she is not relatively superior. Man's temperature on the whole is higher than woman's. His blood is richer in red corpuscles, and is of a higher specific gravity than hers; but it is curious to note that the specific gravity of a woman's blood rises with the approach of old age—*i.e.*, as she begins to lose her feminality (see p. 253). No conclusive distinctions have been established as to the respective capacities of the two sexes with regard to taste, sight, and sound; but apparently women possess a greater power of discriminating between colours, and men a keener sense of smell. Men are certainly more liable to colour-blindness, and women possess the power of visualisation and the somewhat abnormal faculty of colour-hearing more commonly than men. In one

important respect, however, woman stands absolutely apart from man. The periodic function of menstruation influences her profoundly in a thousand ways both physically and mentally, with the result, as Havelock Ellis puts it, that while man lives on a plane, woman lives, for a great part of her life, on the upward or downward slope of a curve. Relatively to man woman possesses a larger amount of nervous tissue, and she responds to stimuli, psychical or physical, more readily than man. This "affectability," as it has been called, is connected with the vasomotor and muscular system, and is responsible for an immense number of distinctively female qualities.

Miss Jane Harrison, in a paper read to the Sociological Society on October 28, 1913, declared that

"woman was more resonant than man, more subject to induction from the social current. Man was better insulated, more independent, more individualised."¹

Deep down, as Mr. Havelock Ellis points out, there is in men and males generally

"an organic variational tendency to diverge and to progress; in woman, as in females generally, an organic tendency, notwithstanding all their facility for minor oscillations, to stability and conservatism, involving a diminished individualism and variability."

This is quite in keeping with the katabolic and anabolic tendencies which are respectively peculiar even to the earliest sexual forms. The line is not everywhere sharply drawn, yet the qualities which are on the whole distinctively masculine are easily separable from those which are distinctively feminine. These respective qualities have clearly been serviceable to the race in the past, or they would not have survived in their present strength, and, so far as can be seen, they must be equally indispensable in the future.

"The hope of our civilisation," says Mr. Havelock Ellis, "lies in the development in equal freedom of both the masculine and feminine elements in life."²

And, since the essence of civilisation is soul-evolution, the elements which are necessary for that evolution here

¹ *Times*, October 29, 1913.

² *Man and Woman*, 369.

³ *Ib.*, 396.

will be needed for the stages which await us beyond the grave, though their expression and their activities may vary. For to those who believe in the survival of the soul after death it seems plain that the chief purpose of the physical organism is to serve as an instrument for psychical development. Body, in fact, is chiefly valuable as a vehicle for mind or soul. Life and mind are different manifestations of the same spiritual energy, and work loyally together. Thus, every physical character will be matched by a psychical correlative. Every human being, therefore, has a soul which corresponds to and registers the experience of the body with which it is associated; and consequently, in the matter of sex, every human being will have a male or a female soul. Many of the qualities now distinctive of sex have a value which is wholly independent of the physical function of reproduction, and consequently there is no reason why they should perish merely because the soul becomes dissociated from the body.

Indeed, as we look closer into these distinctive differences we begin to divine both their reality and their purpose. They lie deeper than convention, deeper than education, deeper than environment; they are part of the cosmic scheme itself. They are part, that is to say, of a scheme whose aim is, not a conglomerate and unintelligible whole, but rather an ordered diversity, wherein its manifold constituents may realise themselves in due relation to each other.

In his *Essay Sur les Femmes*, Diderot, contrasting men with women, remarks: "

"Plus civilisées que nous en dehors, elles sont restées de vraies sauvages en dedans, toutes Machiavelistes, du plus ou moins. Le symbole des femmes en général est celle de l'Apocalypse, sur le front de laquelle il est écrit 'Mystère.'"

This rather inflated description need not be taken too strictly, but it is based on a genuine perception of the realities of the case. Woman, as the highest representative of primeval femaleness, is rooted more deeply than man in the ancient order of things. She is *φυσῇ πρότερα*. She is nearer to primitive nature, to its massive instincts and its untamed emotions. Rouse these into action, and

for the moment the old fire may leap out. When her depths are thrilled she may answer to the cry of the wild; but her answer is as often a prayer as a menace, and finds utterance in some outburst of tenderness, sympathy, or self-sacrifice, welling up from the eternal motherhood of Nature. In the man such qualities are seldom so pronounced, and the emotions which inspire them are usually more restrained. Nevertheless, the original female is the type of stability and repose, while the male, her offshoot, embodies the restless energy which is needful to avoid stagnation. And thus, while woman is the custodian of the treasures of the past, man is ever striving to wrest from Nature new spoils to deck the future. Physiologically, according to Mr. Havelock Ellis, the woman in advancing life tends to revert to the child, the man to the ape¹—a significant distinction.

If it be true, therefore, that male and female qualities are alike indispensable to the due course of evolution, it is reasonable to suppose that the sexual distinctions which give these qualities free play by separating them from each other will be found in succeeding stages as they are found here.

So far, the soul's development has proceeded in association with a material body; and it is likely enough that, for many a stage yet in its upward evolution, *some such* body may be needed for the due exercise and growth of its capacities. Under such conditions the preservation of something like the existing distinctions of sex would present no particular difficulty. But as the soul advances in spiritual growth and acquires a closer adaptation to an environment ever growing more spiritual, will any fitting place be left for sex and its distinctions? For when the present physical body has been replaced by some vehicle of a finer make, we may reasonably expect that the transition from one stage to another will be effected by some less violent process than physical death. Physical reproduction may also be expected to disappear; for in these higher realms of being it will no longer be required to repair the ravages of death or to provide physical tenements for

¹ *Man and Woman*, 390.

the dawning soul. And under these exalted conditions can sexual distinctions exist ?

So far as they are concerned with mere reproduction, obviously they can neither be necessary nor, in any sense intelligible to us, possible. But reproduction, which completes the tale of sex for the animal, tells but half the story for mankind. The qualities which have clustered round it, and the divine grace which irradiates them, are part of the spiritual heritage of the race, hardly won, and still more hardly to be spared. The strange affinity between opposites so often found in the physical order of the universe displays in the delicate counterpoise of these qualities its highest, its loveliest, and in many ways its purest manifestation. Nature, indeed, ever careful for the perpetuation of the race, subtly interwove them with the instincts upon which this perpetuation depends. But they have a purpose which transcends the function to which they now minister, and they will endure and grow fairer when the function has passed away. Here they still feel the sway of the instincts which have enslaved them: it could hardly be otherwise. But even here the bonds are breaking. We need hardly wander beyond the playground of society to find intercourse between man and woman into which these elements enter not at all, or with a step so fleeting as to pass unheeded. And here the light magic which draws the two together lies in the interplay of those qualities which set them eternally apart—qualities now linked with, yet essentially diverse from, the primitive instincts which they veil and adorn. No love-note throbs in it; it is rarely a plea for pity; it may even be a challenge, without losing its charm. And this charm, too dainty to depict, too elusive to analyse, is like the fugitive hues which gleam and hover where the waters of two fountains clash and break. Rarer, perhaps, because less amenable to the existing conditions of life, are the cool, clear comradeships between man and woman, wherein sympathy does not melt into tenderness, or passion enter to disturb the even-flowing loyalty of a faith between friends. Finally, if we turn from the complex intimacies of society to the quieter circle of home-life, the relations of mother and son, brother and

sister, bear testimony to an affection from which love in its narrower sense is perforce excluded, but which none the less depends for its warmth and vitality on the play of the contrasted qualities which beckon sex to sex. For, be it remembered, the primitive female principle is enshrined in the mother rather than the wife; and, even in the woman of to-day, the mothering instinct is usually stronger and always more enduring than the instinct which bids her to mate.

Sex, indeed, with all its subtle influences, outranges far the purposes of the functions which it now subserves, and its distinctive qualities cannot perish though physical reproduction should cease. Even here the friendships and affections of our earthly life are not centred on the bodily presence of those whom we love, but on the mental and spiritual qualities with which their presence is associated. The bonds are woven, not round body and body, but round soul and soul; and unless—which is almost unthinkable—intercourse between discarnate spirits is precluded, soul will still call to soul, though bodily form should be swept away. Every hope which we may fashion for the life to come is bound up with this belief. We cannot but think that the affections and friendships of earth will survive as we survive; and that, when the dawn of the new life breaks, we shall “wake and remember, and understand.” Remembrance, however, implies recognition, and in this we encounter one of the hardest problems which eschatology presents. How and in what guise are we to be recognised, for our aspects are many? For instance, as I have elsewhere written:¹

“A young mother dies leaving an infant child; the child attains manhood and weds the woman of his heart, who bears him children; she dies; and finally the man himself dies full of years. How are all these to meet in heaven? The young mother will yearn to see her baby once more, the wife her lover and husband, the children their revered father. Can the man be all these at once? If not, how are the conflicting claims to be adjusted?”

Clearly, to make recognition possible, there must be some spiritual link between those who are to recognise each other: a link which will survive all changes of the

¹ *Some Problems of Existence*, 19.

body, and serve as a clue to all changes of the soul. For, as our spiritual capacities expand, we may gain a deeper insight into the *latens schematisma* of another personality and the *latens processus* of its development. We may win to a fuller apprehension of even its familiar traits and a wider grasp of its possibilities.

The mother cannot regain her baby, but she may be able to recognise the infant in the man, the promise in the performance; and her tender memories of her child will be illumined, not overshadowed, by the soul in which she recognises her son.

But if there is to be recognition between souls it is imperative that their essential qualities should persist. If, however, the soul of man were to lose its masculine and the soul of woman its feminine elements, even recognition would be barely possible, and the affection, friendship, or love which once knit them together must vanish beyond recall. Such an outcome as this would stultify the whole scheme of soul-evolution, if we rightly discern its trend from the history of the past. Qualities so laboriously evolved and established can hardly be destined to ultimate extinction. Nor, indeed, can we imagine any sphere for *human* energies where the respective qualities of man and woman should be lacking. Quickened and enlarged they may be by the experience of thousands of centuries, and idealised, as they have risen from baser to nobler surroundings, but their distinctive features cannot be lost. The soul of man will remain virile though the primary purpose of sex may have passed away. Woman, no longer a mother, will yet retain the mother instinct, and the delicate qualities which have grown up around it.

True, we can set no limits to man's upward course or pierce the mystery which shrouds its goal. But so long as the evolution of mankind continues to be human, man's soul and woman's soul must alike be needed for its work. From our present standpoint it is not easy to descry the heights before us, and while we are burdened with the ape and tiger we cannot hope to scale them. Yet even now, if we shut out the senses and turn our gaze inwards, we may catch some faint glimpse of a future when the spirit

shall take up the torch which the flesh first kindled, and the lowly attractions which bring cell to blend with cell shall be replaced by the loftier influences which link soul to soul. In such a communion between man and woman no breath of the sensuous could taint an affection which has passed beyond the reach of passion, but has not lost the aspirant impulses by which earthly love is hallowed. The endearing qualities familiar to us here may shine in fresh aspects and unfold a newer charm:

“Some interchange
Of grace, some splendour once thy very thought,
Some benediction anciently thy smile.”

But they will be transfigured rather than changed. For so long as *human* personality endures, it cannot be stripped of the attributes which make it human. The body may fade away with its bodily needs and desires, but the souls of mankind, until they have risen above humanity, must be the souls of men and women to the last.

CHAPTER XX

THE SOUL AND THE ABSOLUTE

IN the preceding sketch we have attempted to follow the soul on its path of development to the very limits of our terrestrial vision. Even so we have been obliged to trust largely to guess-work, guided only by the analogy of the laws of that physical Nature which makes the soul's material environment. But beyond this point we have no such guide to help us, and any speculations upon which we can venture must rest only on "projections," so to speak, into the invisible of the laws which we find in the realm of the visible.

The problem which confronts us is a wide one. What is the relation of Man's soul to the Universe? What part does it play therein? How does it stand with regard to the power by which the Universe is animated? What is its destiny?

Before we can hope to answer these questions we must try to gain some insight into the nature of things. We must try to acquire some general idea of what constitutes Reality.

In one form or another the ordinary philosophical view is that truth and reality are only to be found in an infinite and all-embracing Absolute, of which all particular things, including, of course, souls, are but temporarily or apparently isolated parts. They are "phenomena"—appearances—which only present some minute and imperfect aspects of the Absolute and the Real. We may take our account of the Absolute from Mr. F. H. Bradley, one of its most brilliant expounders. To begin with, the Absolute is perfect.¹ It is not, indeed, the sum total of its appearance, but rather a

¹ *Appearance and Reality*, 246, 401.

unity in which they are all combined and transmuted. Though it *has* all things, it *is* none of them. It *has* therefore ugliness, and error, and evil, but it *is* neither ugly, nor evil, nor erroneous; for

“to assert that it *is* one of its own fragmentary and dependent details would be inadmissible.”¹

On the other hand,

“It is always under correction and on sufferance that we term Universe either beautiful or moral or true. And to venture further would be both useless and dangerous at once. If you view the Absolute morally at all, then the Absolute is good.

Nevertheless,

“Ugliness and evil, all are owned by, and all essentially contribute to, the wealth of the Absolute.”

It is rather difficult to pick one's way among these subtle contrarieties. Indeed, good and evil generally are mere appearances—“one-sided aspects, each overruled and transmuted in the Whole.”² Mr. Bradley, it will be observed, speaks of these things as being “overruled *and* transmuted” in the Whole. But which is it to be? For the two terms are by no means identical. If the major chord of C, for instance, be struck on the piano, each of the component notes may be said in a sense to be *overruled* by the resultant harmony of the chord, but none of them are in the least *transmuted*. Each retains its specific quality. Put in another way, the phrase represents the difference between a mechanical mixture and a chemical combination. In the former the component parts are modified by each other, but they retain their respective identities; in the latter they are all *transmuted* into the substance of the combination. Mr. Bradley leans to transmutation, but his language is not always consistent in this respect. For instance, he declares that

“every flame of passion, chaste or carnal, would still burn in the Absolute *unquenched and unabridged* [the italics are mine], a note absorbed in the harmony of its higher bliss.”³

The distinction has rather an important bearing on our ideas of the Absolute. For if all the things and qualities

¹ *Appearance and Reality*, 488-9.

² *Ib.*, 401.

³ *Ib.*, 172.

familiar to us here as "appearances" exist unchanged in the Absolute, it is not easy to understand how evil and imperfection generally enter into the composition of that which is *ex hypothesi* perfect. If, on the other hand, all these things and qualities are transmuted into something beyond our experience and comprehension, we are clearly incompetent to ascribe any of them in their untransmuted condition to the Absolute or, indeed, to predicate any phenomenal thing, or quality, or condition (*e.g.*, bliss) about it at all.

However, to turn to matters nearer our immediate inquiry. To the philosophy of the Absolute Man's soul no less than his body is of a phenomenal character: it is an appearance, an aspect of the Absolute. Consequently, any independent future existence for it must be regarded as decidedly improbable.¹ The Absolute, no doubt, contains personality as it contains everything; but it is not itself personal, and is rather to be considered as super-personal.² And in this super-personality every human personality will be ultimately effaced, either by way of subordination or of transmutation.

From the standpoint of Absolutism a soul may be regarded as a special though partial manifestation of the Absolute, as a centre or focus of spiritual energy within it, or, to borrow what I think to be the happiest of Mr. Bosanquet's similes, as

"a thread or fibre of the absolute life, or rather . . . a stream or tide within it of varying breadth, intensity and separateness from the great flood within which it moves. . . . Though fluctuating in range and energy, it has a relative and finite individual nature—an apparent individuality—and a certain seeming persistence in time. Yet it has no barrier of division against the absolute, with which it is continuous, to speak in spatial and temporal similes, before and after and on every side of its spatio-temporal being."³

The soul, therefore, on this view, is "beyond escape an element in the Absolute." As a personality it is *prima facie* but a transitory appearance, and though it may conceivably continue to exist after death as a personality for

¹ *Appearance and Reality*, 506.

² *Ib.*, 533.

³ *The Value and Destiny of the Individual*, 129-30.

some indefinite time, it must ultimately merge and disappear in an Absolute which is outside Time.¹

We may here take note of a curious argument urged by Mr. Bradley against the immortality of the soul.

"There is," he says, "one sense in which the immortality of the soul seems impossible. We must remember that the universe is incapable of increase. And to suppose a constant supply of new souls, none of which ever perished, would clearly land us in the end in an insoluble difficulty. But it is quite unnecessary, I presume, to hold the doctrine in this sense."²

Mr. Bosanquet seems also to be impressed with this difficulty.³

It appears to me, however, that the only difficulties to which this objection can refer would be difficulties caused by lack of material or lack of room. But the universe as existing in space is *ex hypothesi* infinite, and therefore the multiplication of immortal souls would not produce either of the contemplated difficulties. Moreover, such multiplication would be effected by a transformation of existing material, not by any addition of new material.

Lotze, whose Absolute is somehow identified with a personal Deity, naturally sees no ground for supposing that souls can enjoy a personal immortality. Fechner, on the other hand, believed that man's soul issued, indeed, from the divine consciousness, but he emphatically opposed the idea that it will be reabsorbed into this consciousness after death. On the contrary, he held that after death the soul will continue to live *in* the divine consciousness, while retaining its individual existence in a higher and richer form than on earth.

Dr. de Tünzelmann also looks forward to the ultimate union of the soul with God, but he is opposed to the idea of its absorption on religious grounds.

"The emergence of human personality is explicable only as the action of the Divine Will, as Love, constituting the so-created personality a unique object of God's interest and love. It does not appear to be in accordance with reason that a personality, so constituted, should disappear in the very attainment of its complete

¹ *The Value and Destiny of the Individual*, 258-9.

² *Appearance and Reality*, 502.

³ *The Value and Destiny of the Individual*, 267, note.

perfection. For that would imply that the personality, a unique object to God's love during the whole process of attaining perfection, must cease to be an object of this Love when the process is complete."¹

Mr. McTaggart, though regarding the soul as a manifestation of the Absolute, does not find this incompatible with its personal survival. As he truly points out, it is difficult to give any real significance to human life without supposing for it some sort of continuity.

"Our lives indeed are so fragmentary that, in trying to explain them, we are almost tied down to two alternatives—either they mean nothing, or they are episodes in a long chain. That they should mean nothing—or at least nothing except as a means to something else—is not compatible with the view of the self which we have been led to adopt. And any attempt to give them meaning would seem to require that they should not be the only manifestations in time of the selves which experience them, but should form part of a longer process, stretching before as well as after."²

His theory has many points of resemblance to the philosophies of the East, though even these teach that all souls must ultimately be resumed into some primal being or substance. According to them souls are projected outwards from some semi-divine centre, and ultimately win their way back to it through countless reincarnations. Then, after all desire is purged out of them, they become fitted to pass into the untroubled calm of Nirvana. Nirvana is ordinarily considered to involve an absorption of the personal self which is incompatible with the persistence of its self-consciousness and individuality. But according to the esoteric form of the doctrine, though Nirvana is a state of "absolute consciousness in which all sense of individuality is merged in the whole,"³ the human individuality is not permanently extinguished, but only temporarily suspended. The Universe is subject to alternate periods of "out-breathing" and "inbreathing" (*Manvantara* and *Pralaya*)—of activity and repose, not unlike the Rhythm ascribed by Herbert Spencer to its activities. At each *Manvantara* the souls comprised in it wake to life once more, and set forth on a new career. Obviously this theory provides

¹ *God and the Universe*, 214.

² *Studies in Hegelian Cosmology*, 48.

³ *Sinnett, Esoteric Buddhism*, 163.

large possibilities of spiritual progress which are altogether absent from the exoteric form of the creed.

Dr. Bucke points out that Nirvana does not mean the extinction of the soul, but rather the extinction of the lower mental and moral elements which would prevent the soul from enjoying holiness, with its perfect peace, goodness, and wisdom. It is this extinction of the lower desires which precludes reincarnation, and thus enables the soul to pass into eternal life.¹

A Western form of this Theosophical doctrine has lately been propounded by Lord Ernest Hamilton in his remarkable book on *Involution*. According to him,

“the psychic quality which for want of a better name we call soul is drawn from the Central store, or Protarch, exactly as a raindrop is drawn from the ocean. It starts in association with the lowliest forms of life and works its way up, through man, to something as much higher than man as man is higher than the amœba. In the end it rejoins that from which it came, just as the raindrop rejoins the ocean.”²

To a finite mind this cyclical process must surely seem singularly aimless and irrational, but it may be said that a finite mind is not in a position to criticise the Absolute. The process as above stated appears, if I understand it rightly, to be Monistic in character, but later on Lord Ernest adopts a Dualistic explanation of it. This makes the process more intelligible, but at the expense, I think, of the author's consistency. The detachment of the soul, by which the cycle is commenced, is explained to be due to “a violent divorcement from the central Protarch—i.e., from the principle of Good, or God,” by the action of a principle of repulsion which stands for evil. “Thenceforward, the Good strains after a return, and the evil impedes that return.”³ Nevertheless, in the long-run the Good will prevail. “The soul is always winning nearer and nearer to the Absolute” (which the author appears to identify with God), and will ultimately be merged in the Protarch.⁴

It is obvious, however, that if God and the Absolute are to be identified, the idea of a violent detachment and

¹ *Cosmic Consciousness*, 76.

² P. 229-30.

³ *Ib.*, 263-4.

⁴ *Ib.*, 268.

projection of a fragment of the Deity (μόριον τοῦ θεοῦ),¹ and the subsequent return of the fragment, is quite inadmissible. For everything is necessarily contained within the Absolute, and cannot possibly get outside it. Consequently, the homing souls are always at their destination, and, indeed, have never left it.

And this throws a useful light on the so-called absorption of the soul into the Absolute. We may describe the situation in this way for the sake of pictorial vividness, but by so doing we are in danger of obscuring its realities. For the process is not a projection of spiritual units from some central mass, and their subsequent return to it, but an internal redistribution or reconstruction within the mass itself. Accordingly, what we call the absorption of the soul into the Absolute is merely the melting of the smaller stream in the greater flood. The latter is essentially unchanged; it is only one of its modes of appearance which has altered.

But, indeed, all schemes of Absolutism or quasi-Absolutism seem more or less unprofitable and unsatisfactory, so far as the human soul is concerned. Under any explanation the soul must represent some special manifestation of, and consequently some change or variation in, the Absolute. But if we are to regard the Absolute as an ultimate reality which is outside Time, it is impossible to understand how any change can take place in it, particularly a change involving existence and development in time. Evolution itself under such conditions becomes impossible, or at least illusory. It may have a relative or phenomenal existence for our limited faculties, but it has no place in Reality. For evolution is a process of change pursued through vast periods of time, while Absolute Reality is an eternal "Now." Evolution in such a case is but a toy with which human consciousness is allowed to amuse itself, and nothing more.

The presumed perfection of the Absolute presents a similar difficulty, and a further special one of its own. How can the Perfect change without losing its perfection? And if such a loss could be avoided, human souls ought to display the perfection of their origin—a conclusion mani-

¹ *Cosmic Consciousness*, 257.

festly opposed to facts. All such changes from timeless and spaceless reality into appearances or differentiations subject to temporal and spatial limitations are merely blots on its purity.

All these are solid objections to the acceptance of a theory which is otherwise distasteful to us by the apparent aimlessness of the processes which it consecrates.

Is it not really a saner method to take the facts of life as we find them? To look at the story of evolution as a whole, and from this survey to read the future in the pages of the past; to believe that the Power which evolved the human personality will not fail in might or weaken in purpose; will not fling away the handiwork so carefully wrought, but will use it as an instrument for still higher achievements? Facing things fairly, is it not at once more reasonable and more hopeful to give the heritage of the future to the self-conscious personality, rather than to throw it back into the melting-pot from which personality emerged?

The late Professor Green, from his own standpoint, states the case for the survival of the self-conscious personality with great force and clearness. Regarding the human soul as a medium for the expression and fulfilment of some divine principle, through the realisation of man's higher capabilities, he asks, Does this principle

"realise itself in persons, in you and me, or in some impersonal Humanity? Do the capabilities spoken of admit of fulfilment in individuals, or is the perfection of human life some organisation of society in which the individual is a perfectly adjusted means to an end which he is not in himself?"¹

After showing that man's true realisation can only take place in a society, he draws the obvious conclusion that a society involves the existence of distinct self-conscious personalities, while it is only through society that personality can become actualised.² Other capacities may pass away after fulfilling their appropriate part, but

"a capacity consisting in a self-conscious personality cannot be supposed so to pass away. It partakes of the nature of the eternal.

¹ *Prolegomena to Ethics*, Sec. 181.

² *Ib.*, Secs. 182, 190.

It is not itself a series in time; for the series of time exists for it. We cannot believe in there being a real fulfilment of such a capacity in an end which should involve its extinction" (Sec. 189).

Consequently, the spiritual progress of mankind is an unmeaning phrase

"unless it means a progress of personal character and to personal character—a progress of which feeling, thinking, and willing subjects are the agents and sustainers, and of which each step is a fuller realisation of the capacities of such subjects. It is simply unintelligible unless understood to be in the direction of more perfect forms of personal life."¹

But can all man's capabilities be realised in any society known to us here ?

"There may," replies Green, "be reason to hold that there are capacities of the human spirit not realisable in persons under the conditions of any society that we know or can positively conceive, or that may be capable of existing on the earth. . . . We may in consequence justify the supposition that the personal life, which historically or on earth is lived under conditions which thwart its development, is continued in a society, with which we have no means of communication through the senses, but which shares in and carries further every measure of perfection attained by man under the conditions of life that we know. Or we may content ourselves with saying that the personal selfconscious being, which comes from God, is for ever continued in God. Or we may pronounce the problem suggested by the constant spectacle of unfulfilled human promise to be simply insoluble. But meanwhile the negative assurance must remain that a capacity, which is nothing except as personal, cannot be realised in any impersonal modes of being" (Sec. 185).

The function of society is, indeed, to develop persons, but it does not follow that all persons must be developed in the same way. The distinction between the sexes alone is a signal instance to the contrary. Nor need every member be identical in talent or activity, "and it would certainly seem as if distinctions of social position and power were necessarily incidental to the development of human personality."²

But though Green's theory of human immortality is early and courageously presented, it labours under the difficulties which beset all Absolutist systems. Whether the Absolute be something of which, as Mr. Bradley and

¹ *Prolegomena to Ethics*, Sec. 185.

² *Ib.*, Sec. 191.

Mr. Bosanquet consider, the God of religion is but an aspect, or whether, as by Hegel, Lotze, and Green, it is to be identified with God, it is in either case incompatible with the progress which human development requires. The essence of reality is declared to be immutability. According to Green, God is the eternal self-consciousness, of which the human soul is a certain reproduction.¹ Such a self-consciousness is necessarily unalterable, and cannot be subject to change. Consequently, development would also be impossible to it, not only as involving change, but as representing a progression in time to a state already existing in the eternal. God!

"is a Being in whom we exist; with whom we are in principle one; with whom the human spirit is identical, in the sense that He is all which the human spirit is capable of becoming."²

Indeed, apart from these difficulties, there are other serious objections to the theory. The full significance of such processes may, in truth, be beyond our apprehension, yet we cannot but judge them by the aid of such faculties as we possess.

"The Absolute," says Mr. Bradley, "does not want, I presume, to make eyes at itself in a mirror, or, like a squirrel in a cage, to revolve the circle of its perfections."³

As permanent occupations these certainly do strike one as rather trivial; but, judged by any rational standard, is it not harder still to suppose that the Absolute isolates fragments of itself and sets them to work painfully for the attainment of a perfection which it already possesses in its own fulness? So far as we can track the story of the soul it is a tale of persistent, if not unbroken progress. But progress would be throttled by an enveloping Absolute in which end and beginning are eternally one.

¹ *Prolegomena to Ethics*, Sec. 99.

² *Ib.*, Sec. 187.

³ *Appearance and Reality*, 172.

CHAPTER XXI

THE SOUL AND THE PARTICULAR

SINCE the development of the soul in any intelligible sense of the term seems impracticable under the conditions of the philosophical Absolute, we must either abandon our belief in progress, or find a philosophy which can admit it.

Now, it will have been observed that all the philosophies of the Absolute rest on a basis of *reintegration*. All the finite objects which are brought into existence by a partial disintegration or rearrangement of the Absolute are ultimately to be reabsorbed in it. Sooner or later there is to be a general ἀποκατάστασις, under which the Absolute will recover its complete unruffled perfection. We have seen, however, that Absolutism not only presents grave intrinsic difficulties, but is also hopelessly incompatible with any rational system of human development. In development itself we cannot disbelieve, for its facts are forced upon us from all sides. On all sides we see the gradual emergence of the complex from the simple, and we find it increasingly difficult to suppose that all these elaborate processes have been initiated merely for the caprice, so to speak, of a power which has no need of the processes, and already possesses their results.

In view of these considerations, may it not be that the theory of an all-absorbing Absolute is an error, and an error which is exactly the opposite of the truth? May it not be that the principle which "beckons the worlds along" is not *reintegration*, but rather an orderly and elaborate process of *disintegration*? May it not be, in fact, that evolution does not tend to the ultimate absorption of all particular things in some absolute unity, but to the diffusion

of an original unity into countless particulars ? Evolution, according to Herbert Spencer's famous formula, consists in a progress from indefinite incoherent homogeneity to definite coherent heterogeneity ; an advance, in other words, from a state wherein existence is an incoherent jumble of all-alike-ishness, uniform in character only because its constituents are merely undifferentiated matter—matter in a state too simple to possess any but the simplest material properties—to a state whereon a differentiating order has supervened, educing from the homogeneous mass all the countless varieties of existing things, diverse in character and definite in type. From this point of view creation will assume a new aspect. It will not mean the production of all things out of nothing, but rather the unfolding of the many from the one. There is a growing tendency to regard existence in its fundamental forms as something in the nature of a tension. Sir Oliver Lodge supposes the ether to possess an inconceivable density, and the matter known to our senses to be a rarefaction of this. We find a similar idea in the theories of M. Bergson, who regards spirit as a tension of which matter is a relaxation. Thus he declares that the tension of a high degree of self-consciousness if relaxed falls into extension.¹ Consciousness has only to let go its tension to extend.² Dialectic is a relaxation of intuition.³ Extension is only a tension which is interrupted.⁴ Life itself, which he rightly regards as something spiritual, he describes as an undivided flux, which, however, keeps subdividing itself into individuals, thereby producing a continual creation of souls.⁵ Moreover, the whole tendency of evolution is to diverge into the various, not to converge into the one, and there is no warrant for supposing that this process is ultimately reversed, and that all the varieties of evolutionary creation will be reabsorbed into an Absolute. May we not, therefore, rather regard creation as the result of the creative power seeking to realise itself by a partial relaxation which would enable the liberated energy to be manifested in a material form ? Material existence in all its variety and with all its laws thus springs

¹ *Creative Evolution*, 219.

² *Ib.*, 250.

³ *Ib.*, 251.

⁴ *Ib.*, 258.

⁵ *Ib.*, 263, 284.

into being, but without losing the core of spiritual power which preserves and ordains it.¹

Indeed, the story of physical nature, even in its later chapters, confirms this view. In the blazing mass from which our solar system sprang matter as we know it could not exist. Under the stress of the terrific forces there at work it could exist only in forms of inconceivable tenuity. As the fierce tumult began to simmer down, new forms, more stable in character, began to appear in the cooling mass. At this point we can see the story enacted before our eyes by stars now shining in the heavens. From these we learn that the stage of glowing gas is succeeded by a metallic stage, and this by a stage of carbon. The gaseous—that is to say, the hottest—stars are composed almost entirely of hydrogen and proto-hydrogen—a simpler form of the gas not found on our planet.² As the temperature decreases new elements make their appearance, and the coldest of the carbon stars contain approximately as many elements as our own sun.

“Now, since a star has but few elements when it is hot and many when it is cold, the natural and reasonable explanation is that the many have evolved from the few.”³

And, accordingly, we may further conclude that the evolution itself results from this running down of temperature.⁴ All atoms, as we have seen, are composed of electric corpuscles, and these corpuscles would naturally fall into larger aggregations as the mass grew cooler. We should therefore expect the elements of the lightest atomic weights to appear first, and this, speaking generally, is precisely what occurs.

A similar example of production by disintegration under different though somewhat analogous conditions is furnished by radium and radio-active bodies generally. So long as the corpuscles of which the atoms of these bodies are formed

¹ Dr. de Tunzelmann considers that the course of evolution is simply the process of progressive finitization by which Universal Mind manifests itself in an ever-increasing degree (*God and the Universe*, 194).

² According to Professor A. Fowler this has now been discovered to be proto-helium (*Bakerian Lecture*, April, 1914).

³ Duncan, *The New Knowledge*, 211.

⁴ *Ib.*, 207.

rotate within the atom at a certain requisite velocity, the atom holds together. But as the velocity slows down, a point is reached when it is insufficient to counteract the intra-atomic energy of the corpuscles. An explosion then takes place in which various substances are thrown off which in their turn often break up into others. Here the process, unlike that of a cooling star, is altogether independent of thermal or chemical conditions; but its issue is similar—namely, multiplication by disintegration. In fact, during this process of molecular disintegration radium, as Professor Rutherford has remarked, may be looked upon as continuously giving rise to new elements by a process of material evolution.¹

Guided by these analogies, let us substitute for the comprehensive and stable completeness of the Absolute something which is motion rather than repose, full of possibilities whose realisation lies outside itself, and whose aim is differentiation rather than unity. And from some such source as this let us suppose the cosmos to have been evolved. Here, however, we are confronted by a familiar difficulty. We have to find for the physical some metaphysical origin. We have to seek an explanation of human experience in something which transcends it. And yet, because this metaphysical and transcendental something is and must be beyond our apprehension, we cannot adequately describe or even conceive its nature, though we are forced to believe in its existence. Yet some attempt must be made to indicate, however imperfectly, the sort of qualities which we suppose it to possess.

We have seen (Chapter VI.) that the ultimate reality, the source from which mind and matter alike issue, is Spirit. But though Spirit be the fount of all existence, there is no need to clothe it with the cumbersome and contradictory attributes of the Absolute. It cannot, for instance, be described as infinite, for it is Timeless and Spaceless, and the term "infinite" has no meaning except in some relation to Time or Space. For the same reason it cannot be supposed to comprehend within itself all the finite objects of creation, which exist only in Time and

¹ *Times Literary Supplement*, June 26, 1903.

Space. It is simpler to regard it as something wherein all created existence lies *in posse* rather than *in esse*: something which is the port of departure for all created things, but not the haven of their return. With what sort of attributes, then, must Spirit be invested in order to make creation thinkable? In the first place, we must suppose it to be an energy of some sort, for without this no activity could proceed from it. We must also credit it with something which is akin to, though it may well transcend, what we understand by consciousness, and what we understand by Will; we must suppose, that is to say, that it is, at the least, capable of consciously initiating change.

If, therefore, we describe the ultimate reality as something in the nature of a Conscious Volitional Energy, we shall present it in a form which, though undoubtedly metaphysical, is not altogether unimaginable.

We have next to consider the process by which our Cosmic system was called into existence out of this ultimate reality, but in so doing we shall find accurate description impossible, and we shall have to express our meaning as best we may in figurative language only. Spirit, of course, is not subject to the limits or divisions which can be applied to Matter; but nevertheless we must regard the creative activity which brought forth our universe as being, in some sort, a part of the primal Spirit, liberated from this by a relaxation of tension such as is above suggested. This liberated activity will, in virtue of its liberation, enjoy freer powers of functioning in different directions. It will also comprise in itself all the potentialities of the creation that is to be, and, in a sense, it will be at once creator and created. Mysterious as the process must be to our limited intelligence, the work of creation will then proceed by successive relaxations, under which this unextended spiritual activity will become manifested in extended forms. The first of these forms to appear will be mind-stuff, to be followed in due course by ether and all other (if any) imponderable substances, and finally by the ponderable matter of the physical world, probably in the order of gaseous, liquid, and solid. But at the back of it all the spiritual activity will remain to pour out through creation the energy

by which alone it can be sustained and its possibilities developed.

It has already been shown (Chapter IV.) that even ponderable matter, notwithstanding its apparent inertness, is, in fact, made of motion; and in the light of modern science it is fast becoming clear that reality is to be sought, not in the quiescence of an all-comprehensive Absolute, but in the change and movement of an untiring Activity. The problem is an old one. Nearly 2,500 years ago Parmenides and Zeno insisted that pure Being was the only reality. The obvious objection to this theory was that it made motion and change (which involve an element of *Not-being*) inexplicable. Reason declared that Being must be immutable; experience insisted on the reality of Change. The deadlock was complete, till it was solved by Heraclitus of Ephesus, who taught that Reality lay, not in a condition of fixed and quiescent Being, but in a ceaseless stream of Becoming. "All things are a-flow: nothing remains constant." From transition and motion and combination come all those objects which we, speaking inaccurately, say "*are*." But in truth nothing ever "*is*"; it is always "*becoming*." We do not step into the same river twice, perhaps not even once; for as we step both we and the river change. The existence which we see around us is but a chain of Becoming, whose various forms are fashioned out of the eternal fire, in which Heraclitus saw the origin of all things. Fire, in fact, was to him the raw material of the visible world. Becoming was its law.

We need not pursue his philosophy into its details. We are chiefly here concerned with his fundamental principle that the Real is the Becoming, a principle which has lately been appropriated by M. Bergson. We may not accept the whole of the ingenious philosophical system which M. Bergson has constructed, but in any case it is clear that the creative principle of things must be, in some sense, an activity. Such an activity we may well regard as a manifestation in Time and Space of the Timeless and Spaceless Spirit: an effort put forth with creative intent, and animated by the consciousness and volition of the source from which it issues. It would in some respects resemble M. Bergson's

vital impetus (*élan vital*), but, unlike the vital impetus, it must be deemed to be actuated by purpose. Strange as it may sound, M. Bergson's vital impetus, though conscious itself, and issuing from a primordial superconsciousness,¹ is quite purposeless in its operations. By virtue of its initial impulse, life is a creation which goes on for ever. Yet it is not bent on producing any specific work, nor does it make for any particular goal. Its activity branches out in all directions, yet it is inspired by no definite purpose, it follows no definite plan, it is controlled by no preconceived design. Its course is largely determined by accident.² "It takes directions without aiming at ends."³ Its course is not straight like that of a cannon-ball, but rather like that of a shell bursting into fragments, which, in their turn, should burst into other fragments, and so on indefinitely.⁴

That a conscious creative Power should act in this aimless way seems to me unthinkable. Indeed, the idea is not consistently carried through by M. Bergson himself. For this purposeless impetus is said to feel joy in its creations, to display a tendency to act on inert matter, and a still more purposive tendency towards the formation of individuals. Moreover, the living beings which it forms begin at once to exhibit a very distinct purpose in their conduct. Jennings has shown (*Behavior of the Lower Organisms*) that this occurs even in the lowest ranks of life. We must, therefore, if M. Bergson be correct, concede to the bacterium a purposiveness denied to the power which created it. M. Bergson's object in adopting this position will be considered later (Chapter XXIII.).

Returning, however, to our main theme. When this conscious and volitional activity has issued from Spirit to proceed on its active work, the field thus opened to it would present an arena in which its inherent potentialities could be realised, and its true unity more nobly manifested in a creation rich with variety and multiplicity. For unity is not necessarily simple or uniform; it may well be multiplex, provided that the multiplicity be harmonious. A chord is a unity no less than a single note, and stands higher as a

¹ *Creative Evolution*, 275.

³ *Ib.*, 108.

² *Ib.*, 110.

⁴ *Ib.*, 103.

product of musical art. Applying this process to the development of mankind, Mr. Fielding Hall writes:

"Life is a melody the Great Musician wrings from out the hearts of men. At first but a few notes; more notes and then more strings sounding in unison. But as the great Composer seeks for greater music, he finds that he must have more instruments. Each heart cannot sound the whole, the scale becomes too great. There must be many different instruments. There must be violins and harps and flutes and trumpets, drums, and cymbals; there must be voices, men's and women's: soprano, alto, tenor, bass. So only can you have full harmony. Each must sing and play his part alone, and yet in each heart must be the music of the whole."¹

And if this be so, if many various notes be needed from the lips of the choir that chant the chant of the whole, we may gain a deeper insight into the purpose which works through the diversities of the human soul. As yet this Cosmic music is marred by many discords. Sin, folly, and ignorance crash harshly through its strains. But all shall be attuned at last into the one great harmony wherein the divine power will find its full manifestation. For, indeed, no element can be spared if the whole is to be perfect. This much even our limited vision can apprehend. Omnipotence might call perfection into being with a single *fiat*, but a Deity of limited power must use means to achieve the end, and these means must, obviously, be themselves imperfect. Moreover, human perfection can only be realised in a duly blended combination of human qualities. If a society of pure egoism would be wellnigh intolerable, a society of pure altruism would simply fall to pieces. Each is needed for the whole. All diversities must be duly represented, though they need not be combined in each individual. It will often suffice if they are possessed by the community as a whole. Indeed, this communal preservation of opposites may be the final purpose of sexual distinctions of character, which will thus survive after sexual functions have disappeared (see Chapter XIX.). At the same time, when we speak of human qualities, we must make sure that the qualities to which we refer *are* human. Many which we now possess are obsolete survivals which in due course will disappear altogether. Many more are

¹ *The Inward Light*, 202.

still but human qualities in the making: qualities which are rooted in an animal past, and are not yet fully shaped into human form. And, as this moulding process draws nearer completion, many opposites, apparently irreconcilable, will draw nearer to each other. Savage ferocity cannot dwell with terror-stricken submission, but valour and humble-mindedness are often found together. This does not mean, however, that our advancement will end in a dead level of tame similarity. On the contrary, each soul will preserve, though in loftier form, its distinctive character, its predominant qualities; but it will respond with a quicker sympathy and keener appreciation to those of the fellow-souls who are also its fellow-workers towards the same end. Regarded from this standpoint, the creation and preservation of human individuality is seen to be essential to the purposes of the divine scheme, while philosophy can join with religion in declaring that "the very being and blessedness of God are implicated in the existence, the perfection, the salvation of finite souls."¹

We may expect, therefore, as the possibilities of the creative Activity become unfolded, to detect, through all the transient discords, an inner harmony not less real than the ruthless calm of an Absolute in which all its ordered multiplicity would be swallowed.

Are we really justified, however, in concluding that this process of differentiation represents the ruling principle of evolution, or must we regard it merely as an evolutionary phase? Many would take the latter view. We are warned, for instance, by M. Le Bon that all matter is being slowly resolved back into the ether out of which it was formed. M. Le Bon's theories have been subjected to some severe criticism; but, assuming them to be true, how do they affect the prospect of the survival and endurance of the human soul? Throughout this discussion we have always been alert to seek aid from the facts of physical nature for our speculations as to the history of the soul; and if M. Le Bon's view be correct, it must be admitted that the fate of matter lends no help to a belief in the individual survival

¹ Caird, *The Fundamental Ideas of Christianity*, 155.

² *The Evolution of Matter*, passim.

of the soul. If all material things are to be resolved ultimately into ether, or matter-stuff, why should not each soul be resolved into simple mind-stuff? We must not, however, follow this analogy blindly. If we are right in supposing that matter and material structures exist only for the benefit of mind and mind-structures, we must not raise matter to a level with mind, or read the career of the master in that of the servant. The laws of matter are to some extent a guide to those of the mind, because they sometimes point to the direction in which mind is travelling. But they do not inspire the journey or control the route. The purpose of matter and of the material forms in which mind functions here will be fulfilled when mind rises above the possibilities which they offer. In such cases there may be no reason why they should not sink back into ether. But mind need not suffer any similar relapse, any more than a man need die when he discards a worn-out garment.

But indeed, according to Professor Duncan, there seems some reason to consider that no such total disintegration of matter need take place. It is true that the heavier atoms are being steadily disintegrated, but it is possible that this is balanced by a reverse process—a synthesis—on the part of the lighter atoms, which may be continuously growing “by the gradual accretion of other corpuscles and the storage of the requisite energy through vast stretches of time.”¹

But however this may be, there is nothing to forbid us to believe in that persistence of the individual soul after death to which so many probabilities point. From the evidence before us we may reasonably infer that the aim of evolution is a host of varied individualities rather than an all-absorbing oneness in which individuality would be lost, and that the power of survival enjoyed by the mind-structure of the hydrogen atom will not be denied to the human soul.

Any story of creation, however, brings with it a kindred question of the deepest interest to mankind. So far we have presented creation in its metaphysical aspect only. We have referred it to the operation of a spiritual activity.

¹ *The New Knowledge*, 243-4.

This may satisfy the intellect, but the human heart cannot rest on such an intangible conception, and demands for creation a personal creator. Nor is this demand unreasonable, for the consciousness and volition with which we have been forced to endow the creative activity are only familiar to us, and, indeed, can only be conceived of by us, as attributes of a person. Nay, more, the spiritual power which emerges on its creative mission and descends into Time and Space for the creation of individual things may well be supposed to conform to its self-imposed conditions, and to assume the individuality with which its work is to be stamped. In this form only can it become intelligible to the self-conscious beings of its creation, and in this form it appears to them as a person and a God. We shall deal more fully with this aspect of the creative power in the concluding chapter.

CHAPTER XXII

REINCARNATION

IN the case of the lower animals it seems probable, as already pointed out (Chapter XI.), that their mental development must depend largely on some system of reincarnation. Is this also a necessity for man? The question is full of interest, though not free from difficulty.

When the soul appears for the first time, when a self-consciousness emerges from its ancestral consciousness, it must obviously incarnate in a physical body to embark on its human development. It must, in fact, incarnate once at least. Does it in the course of its progress incarnate more than once, or, after a single physical death, does it continue its course of development in a discarnate condition? It seems difficult to accept the latter alternative. It is tolerably clear, as Green insisted (Chapter XX.), that the development of the human soul can only be fitly effected in some society. It is also clear that any society into which the soul could enter after the close of this present life must be a society closely resembling, in its spiritual, moral, and intellectual ideals, that in which it moved upon earth. Only on such terms would its evolution be possible. The assimilation of the soul to higher and higher conditions must be gradual. It cannot suddenly be pitchforked into perfection. There is no reason whatever for supposing that physical death produces a sudden and violent change in a person's character. The soul immediately after death must differ very little from what it was immediately before death. It may be capable of passing into a somewhat higher environment, or be endowed with somewhat wider capacities, but it cannot be fitted for transportation into any such perfection as that of the orthodox heaven. An

evolutionist can only believe that its development proceeds by gradual stages, a view which is corroborated by a well-known passage in the Gospel of St. John, "In My Father's house are many mansions."¹

These words are put by the Evangelist into the mouth of Jesus, but as they stand they are barely intelligible. "Mansions" is mere nonsense, being simply a servile mistranslation of the "*Mansiones*" of the Vulgate. "*Monastiones*," however, is a correct rendering of the Greek *μοναί*, the word used in the Gospel text, and both mean "resting-places," particularly with reference to the stages of a journey. This utterance, therefore, appears to contemplate a future of many stages for the human soul. Where the various stages may be situated can only be a matter of conjecture. Much will depend on the character of the bodily vehicle with which the progressing soul will from time to time be associated. A body as densely material as the present material body could only live under conditions similar to those which surround us here; a body of the texture of ether might exist, conceivably, in the heart of the sun. But the soul of the ordinary human being cannot yet be fitted for any body which does not, at least, closely resemble a human body; and we must therefore suppose either that it reincarnates in some human body on this earth of ours, or that it migrates to some other sphere where a suitable body and suitable conditions are provided for it. Of these two alternatives, reincarnation on this earth is clearly the simpler, and we may reasonably adopt it in the absence of any evidence to the contrary.

At this point, however, we encounter a serious difficulty presented by the question of mental heredity. The hereditary transmission of mental qualities seems at first sight as indisputable as the transmission of physical qualities. According to the view taken here, the mental qualities belong to the soul; but if that be so, a person's mental qualities cannot have been transmitted to him by the physical parents of the body into which the reincarnating soul enters. The difficulty, however, disappears if we have been right in concluding that what the parents transmit is

¹ John xiv. 3.

not the mental qualities themselves, but a brain with a configuration adapted to the functioning of a soul endowed with these mental qualities. The reincarnating soul will be drawn to a brain fitted with a machinery, so to speak, suited to its needs, and one in which its capacities, or some of them, can be further developed. I say some of them, because it is hardly probable that *all* the capacities of a tolerably developed soul could be simultaneously exercised in a single body. Mr. Schiller, indeed, suggests that perhaps a single soul may be manifested in a number of concurrently existing bodies.¹ In this way the simultaneous development of all the soul's capacities might, no doubt, be provided for; but the idea, though interesting, seems somewhat too difficult to be readily accepted.

But again it is said, *How* is the reincarnating soul drawn to the body? This question, it is true, cannot be answered positively, but an answer is not really difficult to imagine. Chemical affinity supplies us with a parallel instance in the material world; and as chemical affinity has now received an electrical explanation, it may be that some analogue of electrical action is the controlling force in the association of the reincarnating soul with its new body. Or again, since all things in the last resort seem to consist of vibration, the union may be due to some special harmony of vibration between the two. Moreover, though we may not be able to detect the law under which the process takes place, the mere fact that every human being is born with a soul and body shows—unless we fall back on a discredited materialism—that there must be some law. And, as Mr. McTaggart points out,

“there can be no greater difficulty in supposing such a law to act on persons who had previously existed than in supposing it to act on persons newly created. The difficulty, therefore, if there is one, is no greater for those who accept pre-existence than for those who deny it.”²

But perhaps the argument which appeals most forcibly against pre-existence (in human form) and reincarnation is the argument from memory. This argument often takes

¹ *Riddles of the Sphinx*, 423.

² *Human Immortality and Pre-existence*, 98.

a double form: (1) If I have had a previous existence, why can I not remember anything of it? (2) Unless I can remember my past, my future has no interest for me. An existence cut up into separate lives, each one of which is ignorant of its predecessor, has no practical value.

"Without memory of my present life, it is said, my future life would not be mine. If memory ceases at the death of my body, I cease with it, and I am not immortal."¹

This second branch of the argument is, of course, no argument against the reality of reincarnation; it deals only with the question of its value to the individual. The fact that reincarnation has no attractions for some people gives us no real ground for denying its existence. To myself personally the objection has never seemed to be of much weight. I think, moreover, that it rests partly on a misconception. It will be remembered that in dealing with the self a distinction has been drawn between the "I" and the "Me." The "I" is the thinking or knowing self, the "Me" is the self thought about or known. A man's "Me" would include at least his body and its transitory attributes, while James gives it a very much larger content. Now, the "I" is an aspect or manifestation of the soul, and passes through physical death unscathed with the soul of which it is a part. Whenever the soul resumes human activity, this thinking and knowing self will reappear with the same, or substantially the same, powers, defects, inclinations, aversions, and so forth, as those which it possessed in its last physical existence. There is no breach of continuity whatever. John Jones is dead, but "his soul goes marching on," carrying his "I" with it. What has disappeared, and *what alone has disappeared*, is his "Me"—his body, his name, and his late physical environment generally. Possibly—perhaps even probably—in his next reincarnation the characteristics which find expression in the "I" will not be *exactly the same* as those which found expression in his previous physical existence; but they must be largely the same, and such differences as may appear will be chiefly evoked by changes of environment. It is, indeed, by such slight and gradual changes that the soul's

¹ *Human Immortality and Pre-existence*, 99.

evolution is promoted; changes not so violent as to shatter the continuity of the Ego, but sufficient to give access to new stimuli which will quicken into activity other capacities of the soul. But this change of environment, while it produces a new "Me," leaves the identity of the "I" essentially untouched; and if I *am* the same Ego as I was in my previous life, this personal continuity is in no way prejudiced by the fact that memories of the previous life no longer reach me.

Moreover, those who stipulate for a memory of their past lives can hardly realise what the consequences would be if this desire were gratified. For if the memory of the past is to be granted at all, there is no reasonable principle on which it could be limited to a single past life. And if it were fully extended, do they realise what horrors such a retrospect would unfold? Over some few of his latest existences a man might possibly linger with pleasure and interest; but as he tracked his soul downward through the darkness he would be faced with all the grim story of its early career. He would see himself revelling in a welter of brutality and bloodshed, barely human in form, and purely bestial in appetite. Mercifully the door which is closed upon our past protects us from being haunted by memories like these. And, indeed, a memory so far-reaching would hamper the course of our development, for it would constantly be dragging into the light records which evolution is ceaselessly striving to bury. We still have the water of some old ocean in our blood; the germ-plasms of lower forms of life are woven into our bodies and our brains. These ancient elements of our being die out but slowly, yet by degrees they do die out; for Nature is slowly weeding out the physical counterparts of ancestral qualities which are losing their use. These physical counterparts are contained in the chromosomes of the germ-cells. Now, the ovum in the course of its elaborate process of maturation throws off some of its contents in certain bodies known as "polar bodies," which pass away and perish with the chromosomes which they contain. These chromosomes therefore disappear from the germ-plasm altogether. We need not suppose that the lower ancestral chromosomes

suffer more than the others under this process of elimination; but while the latter will constantly be replenished by sexual amphimixis, the latter, coming from sources which no longer contribute to human ontogeny, cannot be so replenished. Little by little, therefore, they will cease to be represented in the configuration of the human brain, and the qualities to which they correspond will gradually disappear also.

But while this will be the case with the physical brain, the case of the soul which functions in it will be somewhat different. For nothing in the soul can be similarly eliminated. The smallest incident of its history will be recorded in an engram. The record may grow faint, and its responsive power become atrophied by disuse; possibly, under protracted disuse, it may even disappear. But short of this, if the memory stimulus should reach it, it will struggle to reply. Clearly, therefore, it would be inexpedient that the existence of an undesirable engram should be prolonged by stimulation from memories of the past. Apart from such stimulation it would, at the least, sink, sooner or later, into obscurity. For as the brain grows civilised the access of stimuli to the soul's lower nature not only becomes less frequent, but is also inhibited by its higher nature. Thus, the unbridled acquisitiveness of the savage, though imprisoned, perhaps, in the soul of the civilised man of honour, is curbed by the soul's reactions to the higher stimuli which make theft impossible to him.

In a sense, therefore, the critic who complains that his past existences are lost in oblivion vexes himself in a vain shadow. Though he does not remember them, they are not forgotten; and perchance the time may come when the soul which has risen clear of all baser surroundings, with larger powers and a wider scope, may be able to look back on the story of its past, and read the tale without peril and without dismay.

One other point remains to be noticed. It seems improbable that one existence should follow immediately upon another. Some of the objections to this are obvious. For instance, under what conditions is reincarnation to take place? Is a person to take up the new life at the point

where the last one ceased? The soul of the dead baby might well start again as a baby in the following stage of existence, but what of those who die in later life? Will the man who dies in the prime of life resume at once the ripe powers of his earthly career? Must the old man carry his weariness beyond the grave? If not, what common starting-point can be found for them all? These are questions not easy to answer, and the simplest solution of their difficulties is that offered by Theosophy. According to this theory the soul enjoys a long period of repose—a period to be reckoned in centuries—between each reincarnation. During this period, which is passed chiefly in the state of existence described as Devachan, the soul meets with no *fresh objective experiences*, but is busied in assimilating the experiences of its past life. Reincarnation, according to the Theosophists, springs from the soul's renewed longing for the taste of existence on the physical plane, but the wear and tear of this existence necessitates the intermediate periods of Devachanic repose.

“When a long life on the earth-plane has been lived and a store of experiences has been gathered, this longing for physical existence is satiated for the time, and the desire turns towards rest. Then comes the interval of disembodiment, during which the Ego, re-entering as it were into himself, ceases to energize externally on the physical plane and bends all his energies to internal activities, reviewing his gathered store of experiences, the harvest of the earth-life just closed, separating and classifying them, assimilating what is capable of assimilation, rejecting what is effete and useless. This is the work of the Devachanic period, the necessary time for assimilation, for gaining equilibrium. As a workman may go out and gather the materials for his work, and having collected them may return home, sort and arrange them, and then proceed to make from them some artistic or serviceable object, so the Thinker, having gathered his store of materials from life's experiences, must weave them into the web of his millennial existence. He can no more be always busied in the whirl of earth-life than a workman can always be gathering store of materials and never fabricating from them goods; or than a man can always be eating food and never digesting it and assimilating it to build up the tissues of his body. This, with the rest needed between periods of activity by all forms of being, makes Devachan an absolute necessity.”¹

When this process of assimilation is complete the soul reincarnates once more, bringing with it the fruit of its old

¹ Besant, *Reincarnation*, 52-3.

experiences in the form of new or quickened capacities. For although no new action is initiated in Devachan, the soul can progress there by developing the acquirements of its last earthly life.

“The resolute following of abstract thought, of idealistic longings, gives a trend to the Devachanic state that will make it a state of active as well as of passive progress. While Devachan is essentially the world of effects, yet, to this extent, it borrows from the world of causes, though it is also true that the impulse must be given here which will let the wheel still turn along that peaceful road. In Devachan is no initiation of cause, no origination of endeavour, but it allows of continuation of efforts aimed at the highest planes of being that man can reach from earthly life.”¹

The Devachanic existence is represented as one of intense bliss, wherein all the higher elements of a man's nature obtain almost boundless satisfaction. Nor is he cut off from those whom he has loved on earth. But though while in Devachan he still enjoys the friendships of the past, the friends themselves clearly cannot (as a rule, at any rate) be present to him objectively, but only as vivid subjective representations.

On a theory of this kind where no demonstration is possible every person must form his own opinion. But whether the theory be true or not, it certainly does remove some considerable difficulties. It is a theory which is held by a large majority of the human race. Traces of it appear in the New Testament, as, for example, in the question put to Jesus by His disciples, “Master, who did sin, this man, or his parents, that he was born blind?”² Clearly, if being *born* blind was due to the man's sin, it could only have been sin in a previous incarnation. It has sometimes found favour in philosophical quarters; and quite lately (1915) Mr. McTaggart has declared that in the nine years since he first wrote the chapters in *Some Dogmas of Religion* which were republished as *Human Immortality and Pre-existence*, he has become more firmly convinced that the nature of reality can be shown to be such as to justify a belief both in immortality and in pre-existence. Possibly it may be that in reincarnation is the law until a point of development is reached at which death disappears;

¹ Besant, *Reincarnation*, 54.

² John ix. 2-3.

and at this point the soul could, without difficulty, proceed directly from one stage of progress to another.

On the other hand, if there be no reincarnation, there is no doubt considerable difficulty in framing an intelligible scheme of the soul's future development. In this case we can only suppose that, in the realm which awaits us after our earthly life, there are also "many mansions," in some one of which, under conditions unknown to us here, each individual soul will find an environment suitable to the due development of its capacity.

Moreover, though we may reasonably expect to carry into the next stage of existence the character which has been elicited by the experiences of our present earthly life, we must not expect that all of it will permanently endure. For it must be remembered that what permanently survives is the soul in its entirety, not any particular self. Under the various environments which subsequent stages of existence (whether by reincarnation or otherwise) will bring, a variety of selves would be manifested, each of which would develop to a greater or less extent some special group of soul-qualities. In the course of this process some of the qualities manifested in our present selves may be expected to disappear or be submerged, and only those fitted for the higher environments of the soul to survive effectively.

CHAPTER XXIII

THE SOUL AND THE UNIVERSE

IF the conclusion at which we have now arrived be warranted, and the human soul, developing through the experiences of its countless selves, be destined to preserve and persist in its individuality through incalculable ages, if not for ever, it now remains to consider what place it will fill hereafter in the great scheme of things to which it belongs, what part it will play in the living drama of the Universe.

So far we have carefully accentuated the distinction between the soul and the self, the soul being the permanent reality of which each self is but an aspect. Yet each self has a certain permanence of its own. Through all the countless stages of the soul's development the self changes but slowly and minutely. Each self is very like the self of the preceding stage, and will closely resemble the self of the stage which succeeds it. It is, in fact, in most respects the same self. It starts on each new stage with the characteristics which belonged to it at the close of the preceding stage, and it is not till the end of each stage that the differences representing the development of that stage will appear in full. In each stage, in the normal course of events, a little advance is made, a little gain recorded, even if such gain be but the negative gain of an undesirable quality schooled into subservience. But the differences in each case are slight, and only by casting one's vision back—if that were possible—through many an earlier stage to a remote past could any marked distinction be observed between the self that is and the self that was. This process, however, will not endure for ever. Slowly but surely, as self succeeds to self, all the soul's capacities will be evoked

and developed; and when this point is reached the work of evolution is done. The soul of its own inherent strength may indeed move onward to undreamed-of heights, but the schooling of experience will no longer be needed. All that could be learnt from it has been learnt, and in the full plenitude of its knowledge the soul and the self will at length become one. In this way, as the great scheme of things unfolds, the soul will mount upwards on the stepping-stones of its past selves to the kingdom which awaits it.

But, meanwhile, what will its relations be to the Power which lies behind the scheme? We have seen (Chapter XXI.) that this must be deemed to be a conscious and volitional creative activity. But it has for mankind yet another and more sacred aspect. We cannot but regard it as divine; and as such it must needs be the centre upon which all our religious aspirations converge. Now, these aspirations may or may not be warranted, but their existence cannot possibly be gainsaid. They are as truly facts of human nature as any of its most obvious physical elements, and are no more to be explained away than our body or its functions. They demand satisfaction. In what way are they to be satisfied?

One thing at least seems certain. Religious feeling cannot attach to an abstract principle. We cannot realise any communion with a pure activity, or pray to an impersonal consciousness, or worship a mere power. In one form or another religion requires a *personal* deity, but how are the limitations of personality to be imposed upon divine capabilities? Some philosophers, indeed, attempt to make the Absolute a divine personality, but thought will not bear the strain. An absolute or infinite personality is really a contradiction in terms. For the essence of personality is its limitation, its finiteness. A person only exists as a person by virtue of his separation from, and contradistinction to, other persons and things; and hence if a personality could embrace the whole of existence it would *ipso facto* cease to be a person. All attempts to identify the God of Religion with the Absolute are thus foredoomed, by the very nature of the case, to failure. Devotion may make the attempt for the greater glory of its deity, but since the

limitations of personality cannot be imposed on the Absolute, the deity when once so exalted disappears altogether. Seeing, then, that the God of Religion must be a personal God, we cannot escape the conclusion that He must also be a finite God—finite, that is, in His aspect towards, and His relations with, humanity.

The Spirit, of which the Creative Activity is a manifestation, being non-temporal and non-spatial, cannot be described as infinite, a term which is meaningless except in a setting of Time and Space. Its nature is therefore to us altogether inconceivable; we can only postulate it as a realm of reality beyond ourselves, containing the potentiality of all things existing in Space and Time. But the particular Creative Activity which brings these things into existence stands on a different footing. It is a temporal and spatial manifestation of the Timeless and Spaceless Spirit; and though we reverence it as divine, we need have no hesitation in regarding it as finite. This is recognised now even by theologians. Thus, in *Contentio Veritatis*, Dr. Rashdall writes:

“In that sense of the word ‘limited’ in which the being of anything is said to be limited by being distinct from something else, by that not being that other thing, in that sense I should most certainly admit that God is finite inasmuch as He is not Man.”¹

In the same collection of essays Dean Inge declares that

“God as an object of worship—the God of all religion—is not the Absolute, but the highest finite form under which the Absolute can manifest Himself.”²

The existence of evil furnishes Dr. Rashdall with another argument for the finiteness of God.

“If God is good,” he says, “then the ultimate end of the Universe must be good. Anything that appears evil must be really a means to the good.” But “A being who is compelled to attain his ends by the use of means which are bad must in a sense be regarded as limited. And this limitation has generally been admitted by reasonable theologians. Bishop Butler, for instance, admits that there may be things which are intrinsically as impossible as for God to change the past.”³

To the objection that such a Deity is anthropomorphic, Dr. Rashdall replies:

¹ Page 36.

² Page 100.

³ Page 44.

"I am content that it should be so. Some of us will prefer an anthropomorphic Deity to the God who is only matter disguised or a mere intellectual abstraction or a magnified devil."¹

But the limitation of Spirit involved in its manifestation as a personal Deity is not, of course, a limitation imposed by any external power. It may be described with sufficient accuracy for the purpose as a Self-limitation, a limitation designed to bring about a closer, a more harmonious, a more intelligible relation between Creator and created. Indeed, a system of finite things and finite persons seems to demand for its due administration the rule of a finite personal God. For with such a God only can we enter into communion; to such a God only can human aspirations soar, or human prayer be directed; in such a God only can we look to find, though in higher form, the moral qualities which adorn and ennoble the life of man. And as the God of our worship is subject to the limitations of personality, so must we also suppose Him to be limited in power. We are so accustomed to invest the Deity with omnipotence that any curtailment of His power may seem to many almost sacrilegious. But the feeling, though natural, is unjustified. The ascription of omnipotence to the God of our worship originated in an unreflecting devotion which deemed it impious to subject Him to any limitations whatever, without regard to the difficulties which beset the unlimited. Indeed, the term "Omnipotent"—*All-powerful*—contains a fatal contradiction. For the very idea of power implies the existence of some opposing force upon which the power can be exercised; and this opposing force constitutes a limitation of power which is, of course, incompatible with omnipotence. Power, in fact, to be intelligible, must be limited. Consequently, an all-comprehensive unlimited power is self-contradictory and inconceivable. Moreover, the withdrawal of omnipotence from the God of our worship robs Him of no sanctity, makes Him none the less worthy to be revered. Though popular thought may ascribe to Him infinitude, omnipresence, omniscience, and omnipotence, these, as Dean Inge points out,

¹ Page 46.

"do not appear to be His highest and most inalienable attributes as an object of human worship or of human knowledge. . . . The ideas of justice, mercy, sympathy may bring us nearer to the heart of God than that of omnipotence. There is not necessarily anything divine about omnipotence. It is conceivable that the universe might have been ruled by an omnipotent devil; in which case men would have been found to defy him, and go to his hell coerced, but unsubdued."

Accordingly, he says that, in our conception of the Deity, we should

"divest ourselves of the misleading notion of spatial infinity as the highest expression of God's nature, and of the somewhat barbarous and unethical notion of unlimited arbitrary power as His highest prerogative."¹

Moreover, by discarding the idea of divine omnipotence we go far to dispel the dark mystery of Evil, which casts a shadow of malignity upon God Himself. The existence of evil is irreconcilable with belief in a God who is at once benevolent *and* omnipotent.

"But the evil which is wholly inexplicable as the work of an omnipotent benevolence may be compatible with a benevolence whose energy is subject to limitations of power, and may be regarded as a necessary element in the scheme of a Deity whose general purpose is nevertheless benign. We can thus escape from the mockery of belauding a love which, though armed with the fulness of power, hurls evil upon us in a myriad forms; while evil itself loses all its malignity when it is seen to be the rod of God's discipline, not the scourge of His vengeance."²

For evil is indeed the chief instrument by which we are schooled into progress and into the righteousness which follows in its train. And if we ask what righteousness is, the answer must be that it is a life in conformity with the divine scheme by which the evolution of the Cosmos is ordained. This is the root law of all morality, the final test of the distinction between Right and Wrong. For wrong conduct is conduct which runs counter to the purpose of the scheme, and to this there is attached a natural and inexorable penalty of evil. It may take the crude form of physical pain or injury, or the subtler torment of mental dissatisfaction or remorse; but in either case its object is

¹ *Contentio Veritatis*, 100.

² *Some Problems of Existence*, 139.

discipline, not revenge. Taught by a salutary experience of these natural requitals, man learns by degrees to leave the paths of darkness and turn his footsteps towards the light. By this means he acquires, perhaps without precisely formulating them, a body of moral maxims which deters him from the wrong; and these maxims, though acquired originally from experience, gradually become moral instincts which rule in their own right. In the first instance they are prohibitory only. "Thou shalt not" is the note which runs through them all. It is not till later that he realises the inherent merits of the conduct into which he has been coerced, and right-doing becomes an end which he seeks for its own sake. And with this change in the character of man's incentives to action the quality of his conduct becomes changed also. As policy makes way for principle in his system of morals, that which is originally avoided as unadvisable becomes shunned as wrong, and the law of expediency is transmuted into the law of duty.

But it may be asked, How is this change effected? How does a prudential maxim turn into a moral law? For it is clear that the two are not necessarily interchangeable. We feel that the right is something quite distinct from the expedient, in spite of the fact that they often coalesce. The latter points to advantage, the former to duty; the latter may give us a "must": it cannot give us an "ought."

The question is too large to be discussed at length, but I think the solution of the difficulty is to be found in a subtle form of dissatisfaction—the sense of inferiority. This by degrees becomes attached to inexpedient conduct quite independently of any external penalties which such conduct may entail. In primitive communities *actual* inferiority must have been a serious impediment to individual welfare. The discredit which it involved would rob the culprit of many social benefits. He would lose his rightful place in the life of the community, his proper weight in their councils, his due share of their successes; while in the background would be hovering all the prospective penalties which any actual manifestation of inferiority would infallibly call down upon his head. This constant possibility of penalty, whether actually incurred or not, would gradually

drive home to him the conviction that his misconduct had placed him at a disadvantage with the other members of the community, and so would ultimately give rise to a sense of personal unworthiness. And here the notion of Right in its inner sense begins to appear. For Right and Wrong, whatever the standard we adopt, are tested by us all from a personal standpoint. Right conduct is seen to be that which gives worth to the individual, which appeals to the worthier elements of his character, and so promotes his individual evolution. For this reason, no doubt, it is also expedient, but mere expediency does not complete the tale. For, since personal evolution is one of the purposes of the divine scheme, conduct which promotes it is not only expedient, but right.

The innateness of the moral instincts in all civilised communities is by itself enough to disprove Weismann's contention that acquirements can never be transmitted. They are clearly not original elements of human nature, seeing that in the lowest races they are absent altogether. Consequently they must be acquirements; and unless some trace of these acquired moral principles had been gradually transmitted from earlier to later generations, their existence could only be explained by supposing that each individual acquires them afresh, in all their present fulness, for himself. It is suggested that education and the moral atmosphere into which a civilised individual is born would suffice to effect this result, but these influences are altogether inadequate for the purpose. Education can sow the seed, but it cannot prepare the soil. It can instil the precept, but it cannot implant the moral receptivity which makes the precept into a moral law. This innate receptivity which alone can make education fruitful must nearly always be accredited to hereditary sources. It is, in fact, part of man's heritage from the past, an acquirement derived originally from ancestral experiences; and while it may be wholly wanting in the undeveloped savage, it is rarely altogether absent even in the most degraded specimens of civilised humanity. And thus by degrees is built up a body of moral motives by which man's conduct is guided into closer and closer harmony with God's designs.

But here we encounter a fresh difficulty, and we must be prepared to face it frankly. Free-will is often regarded as God's choicest gift to man. But conduct which is determined by motives cannot in any proper sense of the term be called free, and consequently free-will can have no place in the scheme of human evolution. Libertarians deny this strenuously, but the arguments against them seem overwhelming. I have discussed this momentous question at length elsewhere,¹ and I can only touch briefly upon it here. Libertarians may be broadly divided into two schools, which are opposed to each other almost as sharply as to their common enemy the Determinists. One of these, the Indeterminist school, holds that the will is free from all determination of any kind, and can act, not only against the strongest motive, but in disregard of motives altogether. The other school, that of the Self-determinists, declares that the will is determined by the strongest motive, but that the self has the mysterious power of deciding which among the competing motives shall be the strongest. This theory, however, will not really bear examination. It was well described by Sidgwick as an attempt "to run with the hare and hunt with the hounds, and to get the moral satisfaction of a Libertarian view together with the scientific satisfaction of a Determinist view."² In reality it only throws the difficulty a step farther back. For if the self determines the motive, what determines the self? If nothing determines the self in deciding which motive shall be operative, then self-determinism is indistinguishable from Indeterminism. For clearly there is no real difference between an unmotivated power of willing and an unmotivated power of selecting a motive to determine the will. If, on the other hand, the Self is determined by anything, then Self-determinism is indistinguishable from Determinism. As to Indeterminism, both parties unite in condemning it (and rightly) as impossible; nevertheless, it is the only kind of free-will which can properly be described as free. M. Bergson, whose avowed aim is to insert some indetermina- tion into matter,³ evidently recognised this, and so made

¹ *Some Problems of Existence*, chap. ix.

² *Ethics of Green, Spencer and Martineau*, 17.

³ *Creative Evolution*, 132.

his vital impetus undetermined. He may thus attain his object, but at what price! Conduct is made incalculable—a doubtful gain, but Creation is made purposeless—a ruinous loss. It is said that Determinism deprives man of moral responsibility, since a man cannot justly be punished for conduct which is not the outcome of his free choice, but springs from his character. But this objection is altogether unsound. For if, as Determinists hold, conduct is determined by motives, human tribunals, which only exist for the protection of society, are clearly entitled to repress undesirable conduct by supplying deterrent motives in the shape of punishment against it. It is sometimes forgotten that human tribunals are courts of law, not morality. The function of the law is simply to restrain offences against the public; it has nothing to do with private morality as such. To an offender who should protest against punishment on the ground that his wrongful act was not one of free choice, but necessitated by his character, Determinists would reply: “No doubt; but since your character, and therefore your will, is amenable to motives, we propose to supply motives which will operate against a repetition of your misconduct.” In fact, it is only on Determinist principles that punishment can be justified at all; for if the will cannot be determined by motives, punishment loses all its disciplinary value, and becomes mere revenge. I have shown that, on M. Bergson’s theory, conduct becomes incalculable, but this is not the end of the mischief. For conduct which springs from a motiveless, purposeless impulse, an impulse which “takes directions without aiming at ends,”¹ has no claim to be regarded as rational; and consequently the conditions which make conduct incalculable rob it also of any moral value whatever.

But without going more fully into the details of this controversy, it is sufficient for our present purpose to point out that freedom of the human will is hopelessly incompatible with any belief in a divine scheme of things. For in such a scheme the means must be ordained as well as the end, and consequently human conduct, which forms an independent part of the means, must be ordained also.

¹ *Creative Evolution*, 108.

There is no room in such a scheme for chance or lawlessness, and consequently no room for the supposed freedom of the will which really involves both. If it be part of the divine scheme that a certain act should be performed, its performance cannot be imperilled by leaving anything to the mercy of the agent's free-will. Clearly, if this were done, the scheme would be wrecked millions of times a day, and the order of the universe would be turned into chaos. *Orthodoxy* insists on man's freedom, but this belief is altogether repugnant to its fundamental doctrine of divine government. For it is certain that the Providence which ordereth all things both in heaven and in earth could not leave so wide a field as human conduct exposed to the caprice of free-will. Indeed, theologians themselves, though they may cling to their belief in free-will, are beginning to recognise the grave danger which it threatens to the order of the universe. Thus, the Rev. B. H. Streeter, writing in *Foundations*, affirms his belief that miracles are necessary "to act as a corrective to the havoc brought by the vagaries of the human will."¹

But Determinism need neither paralyse our aspirations nor deaden our faith, if we recognise that God's control of the human will is but a part of that supreme control where-with He guides the scheme to its appointed end. Our conduct is indeed ordained, but it is ordained as a discipline to bring out into fulness the soul's possibilities. By sin and folly, by toil, and trouble, and sorrow, we are taught to eschew the evil; in moral endurance and moral victory we win a foretaste of the triumph which awaits the good. Moreover, it must be remembered that one of the conditions which invested free-will with a vital importance has now faded away. While the awful doctrine of eternal damnation brooded in all its horror over the minds of men, free-will seemed necessary to give man a hope at least of working out his own salvation, and to redeem God from the reproach of bringing into existence creatures whom He had foredoomed to an eternity of torment. But this dark belief, with its eternal perpetuation of evil, has wellnigh disappeared, and is being replaced by the growing hope of a

¹ Page 139.

predestined survival of the good. Haunted no longer by the dread of an eternal, or even an age-long, punishment, we can look forward to the consummation of God's scheme, strong in the faith

"That nothing walks with aimless feet;
That not one life shall be destroy'd,
Or cast as rubbish to the void,
When God hath made the ^{list} ~~pile~~ complete."

But though our wills be not free, our souls are not necessarily servile—mere puppets hurried helplessly along the stream of an inexorable fate. For as man advances he begins to perceive in some sort the trend of the scheme of which he forms a part; and, with a soul better attuned to its purpose, he discerns that he is one of God's agents for bringing it to its due fulfilment. Supposing the knife of a surgeon to be endowed with a full consciousness capable of appreciating the nature and effect of an operation, might it not take pleasure in the beneficent work of which it was the instrument in higher hands? And in like manner, when morality and religion thus become one, and the law of conduct fuses with the law of love, man may well find a deep, perhaps an undreamed of, happiness in consciously ministering to the divine end. Dr. de Tunzelmann's standpoint is not precisely mine, but he points to a similar conclusion when he writes:

"In a mental scheme determined by an all-wise and all-prescient universal mind, there is no place for the free, unfettered action of independent units of mind." But, It does not appear "antecedently improbable that the more highly developed among these units should be conscious of sharing in the activity of the greater unity of which they form a part, and at the same time not fully conscious of the restraint necessarily involved in such incorporation."¹

This is no bad substitute for the "havoc of human will," and it will also serve every legitimate purpose of morality and religion.

"I am free when 'I'—the true self—am the author and originator of my own action; but I am not I—the true self—until 'I and my Father are one.' In other words, I am never so free as when I am constrained by the grace of God."²

¹ *Electrical Theory and Problem of the Universe*, 469.

² *Creed of Christ*, 145.

But, it may be said, any religion needs prayer; and does not a scheme of rigid fore-ordination annihilate all the possibilities of prayer? By no means. Of course it is true enough that if there be a divinely fore-ordained order of things, prayers for interference with that order can neither be legitimate or effectual. But prayer comprises far more than mere petition, which, if perhaps its commonest, is also its most limited aspect. Dr. Samuel McComb, writing in the *Contemporary Review*, asserts that

“prayer is not a rigid mechanical process whereby a man goes to God and asks for a definite concrete boon. In the act of prayer we turn ourselves to Another whose fellowship we would enjoy, whose help we would seek, or whose forgiveness we would ask.”¹

In a word, prayer is a communion, more or less intimate, more or less complete, between God and his creatures. Nor is it in devotion alone that this communion can be attained.

“We are discovering now,” says Mr. Brierley, “that God is not only the source and object of the religious feelings, but that He is also a musician, an artist, a mathematician, the Creator and Giver of all beauty, and that in seeking perfection in these directions we are seeking Him.”²

By all these avenues we may draw near to the throne, and in every case the approach is assuredly a prayer. It is a prayer, too, which will unfailingly be answered—indeed, it answers itself; for the impulse which animates it brings us straightway into the communion which we seek. And thus, as Dr. McComb tells us, under the influence of this mystic contact with the unseen the baser elements of our being drop away, and

“our lives are lifted to new planes of experience, where even the face of nature seems transfigured as with an ideal glory.”

And herein, surely, lies the true efficacy of prayer. It flings wide the everlasting doors to a realm of spiritual possibilities whose bounty will not be outpoured on those who linger below, but is ready to be lavished on those who rise to win it.

¹ *Some Modern Aspects of Prayer*, March, 1914, p. 276.

² *Ourselves and the Universe*, 124-5.

"To those who lodge in the soul's uppermost chambers there opens a prospect unseen by those below, unbelieved in by these latter maybe, but none the less real."¹

But there is yet another function which prayer may serve in our scheme of things. "God has no need of our prayers," said a preacher to whom I lately listened. No need? I wonder. May not the uprising of the soul in prayer be welcome to God as the cry of a faithful comrade, and a token of the loyalty wherewith we are striving to work out His ends? Prayer cannot alter the appointed course of things, but may it not be itself one of the links (fore-ordained, no doubt) out of which that course is formed? May it not be man's privilege thus to co-operate with the Deity in the fulfilment of His purpose? Is not some hint of this to be found in the ritual of all religions? When Jahveh let loose his avenging plagues upon Egypt, Moses and Aaron were made his ministers to evoke them.

"And the Lord spake unto Moses, Say unto Aaron, Take thy rod, and stretch out thine hand upon the waters of Egypt, upon their streams, upon their rivers, and upon their ponds, and upon all their pools of water, that they may become blood."²

Or again:

"And the Lord said unto Moses, Stretch forth thine hand toward heaven, that there may be hail in all the land of Egypt."³

So, in like manner, though prayer cannot alter the divine purpose, may it not be part of the machinery by which that purpose is carried into effect? And, finally, may not prayer be needful to God as a means of quickening the relations between Himself and the soul of man, and thereby furthering His ordained realisation of its possibilities?

And here we may pause for a moment to consider what the character of these relations will be. It has varied enough in the past. The exuberant pluralism of early times, which saw a deity in every stream and tree, rested on a certain infirmity of thought which could only explain the processes of Nature by referring them to a hierarchy of volitional agents. (Later pluralisms such as those of Wallace and James belong to a different order altogether.)

¹ *Ourselves and the Universe*, 242.

² *Exodus* vii. 19.

³ *Exodus* ix. 22.

Gradually, as thought matured, the many became absorbed in the one, but this deity was philosophical rather than religious, and tended to disappear in the Absolute. Religion, however, requires a personal deity, and the Deity most closely associated with our religious development is the God of the Hebrews, who afterwards became the God of Christianity. Yet how altered has been His aspect in the course of the ages !

“We cannot possibly overestimate the difference—it is practically infinite—between the God of Samuel who ordered infants and sucklings to be slaughtered, and the God of the Psalmist whose tender mercies are over all His works; between the God of the patriarchs who was always repenting, and the God of the Apostles who is the same yesterday, to-day, and for ever, with whom there is neither variableness nor shadow of turning; between the God of the Old Testament who walked in the garden in the cool of the day, and the God of the New Testament whom no man hath seen nor can see; between the God of Leviticus who was so particular about the sacrificial furniture and utensils, and the God of the Acts who dwelleth not in temples made with hands; between the God who hardened Pharaoh’s heart, and the God who will have all men to be saved.”¹

So profound, indeed, is the difference between the cruel and capricious Jahveh of the Pentateuch and the heavenly Father of later belief, that the former was declared by Marcion to be a spirit of evil. Differences of this kind, however, need not perplex us if we remember that all human contact with the divine is a relation; that all man’s knowledge of God is relative to man’s intelligence.

“God,” says Dr. Davidson, “is a datum of man’s nature, inasmuch as He is the object of a natural want. To this want, man’s spiritual system is organic—which means not only that human nature is dependent for its *satisfaction* on Him, but also that the want itself could not have *arisen* apart from Him.”²

This I believe to be profoundly true; but while the idea of God is a datum of man’s nature, the aspect in which He appears must be conditioned by that nature. Man, in fact, at every stage, gets such a deity, just such an aspect of the divine, as he is capable of apprehending. But this variety of aspects does not affect the essential unity of God. As the soul remains one through all the diversity of its mani-

¹ Momerie, *Church and Creed*, 234.

² *Theism*, 200.

festes selves, so the divine unity remains unimpaired by the diverse forms in which it reveals itself to man. I say "reveals itself" advisedly, for this is in truth the way whereby revelation is effected.

"If God speaks, He can only speak to those who have the capacity for hearing, and in proportion to that capacity. . . . We shall therefore no longer think of revelation as the communication to man from without of certain pieces of information about God, but rather as an act of God within."¹

Even the lowest of these aspects has had its value, however debased it may seem to a thought which has risen above it; for if it teaches nothing else, it at least brings home to the worshipper a recognition of a power which is above him, a power which he must reverence, even though reverence be darkened by dread.

"Many roads thou hast fashioned; all of them lead to the light."

Yes, even though at the outset, the pathway lie shrouded in a horror which seems to reek of the Pit. For God's call is not the same to all men, or at all times. Were it so, His voice would fall on many a deaf ear. Nearly all primitive deities are malign, and not without reason. For power appeals to the savage chiefly as something which can injure, and which must therefore be propitiated. Consequently, primitive worship was mainly inspired by fear. Still, it was worship, and therefore it may be truly said that the noblest aspirations of religion became possible only in the fateful moment when man turned to cower in abject deprecation before a devil. Even now, though the grip of this terror worship has been loosened, it has not been entirely flung off. "Eternal" has been softened into "age-long punishment," but each can come only from a vengeful deity, and no such deity can be the God of our future. Vindictive fury against the defects of His own creatures cannot be ascribed to God, unless we are content to regard Him as a childish savage. Surely our hearts will tell us a very different tale. Maeterlinck, if I rightly recollect, says somewhere that the Power above us will regard our gravest misdeeds as we should regard the vagaries of a

¹ *Foundations*, 56. (Brook.)

frolicsome puppy. This may well be true in so far as it indicates that wrath and vengeance will find no place in God's attitude towards man, but it surely errs in robbing man's conduct of its due worth and its due meaning. For man's conduct, look at it as you will, must be a most potent influence in shaping the moral elements of God's scheme. Even if some particular act achieve no external result, it reacts on the character of the agent, and this alone gives it a high importance to those who realise the truth that conduct springs from character. In due course each act will bring its own chastisement, or be crowned with its own reward; but in no case will it be lost, for it is sped by God's own strength and guided by His purpose. Man may deny God, but no denial can sever the bond which unites them. Man is "beyond refuge" God's creature, and it is the indivisible intimacy of this union which must colour their relations. And as the errors fade away which in the past have obscured our vision of the divine, we shall see, ever more clearly, that the keynote of this intimacy is love. Men have pictured God as a master, a monarch, a law-giver, or in his softer aspects as a teacher, a father, a saviour. None of these aspects ~~are~~ untrue, but the gift of the future will surely be the revelation to us of God as our friend. This aspect, of course, has not been wanting in the past, though it has been overshadowed by others, and it will grow in intensity as the conviction of the kinship between the creature and Creator becomes established in man's heart. At present, while we easily suppose God to be concerned with the great affairs of existence, we do not so readily associate Him with its seeming trivialities. Yet life is largely made up of little things, and none of these are too small for the sympathy of friendship. Nay, more, even the smallest of them fills its fit place in the divine scheme, from which, indeed, it could not be spared. God is doubtless the God of righteousness and truth, of Nature's majestic order, of noble thoughts and heroic deeds, but not of these alone. He shines in the sunlight and is heard in the rain. He is the comrade of our work and of our play-time; He shares our sorrows and our mirth. We are in touch with Him at every point in our daily life, and not

only when we turn to Him in prayer or praise. Let the closeness of this intercourse but once be realised, and the God whom we worship becomes the friend whom we love. And hereby life wins a new warmth and a new sanctity; for as conduct becomes transfigured by this communion with the divine, we begin to see that no part of it is too trifling to be consecrated to the glory of God. Perchance, too, our affection may serve a higher purpose still; for, as Canon Scott Holland writes:

“The stringent demand by God for faith from man is not inspired by the mind of a lawgiver, nor pressed home with the austerity of a judge; it expresses the hunger of a father’s heart to win the confidence and to evoke the capacities of the children of its love.”¹

Exalting, however, as this thought must be, we should not let it carry us too far. We may be sure, indeed, that we are the objects of God’s care: we cannot be sure that we are its chief objects. Even on this earth it may be that there are higher presences than man, and there can hardly fail to be many such in the wider universe beyond it. But if this reflection should make us humble, it need in no sense dismay us. We shall lack no care that we need—and there are many mansions.

And now what is the destiny which the soul’s possibilities will unfold? If it is to retain its individuality it must necessarily continue to advance till in the course of ages it attains a level of wisdom and power to which our present imagination can hardly soar. For such a being anything like a human career would be altogether too confined. Moreover, it will have risen above the need of the discipline of human life, for it will have learned all that can be taught by human experience. It is fitted for a loftier plane of existence, to play a nobler part in the ministry of God’s kingdom.

The idea that the administration of the universe may be entrusted in part to a hierarchy of spiritual beings is no new one, and it is definitely accepted by the Theosophies of the East. It has hardly taken root among Christian beliefs, though so far as I am aware there is nothing in the

¹ *Lux Mundi*, 20.

Christian doctrine which is essentially opposed to it. I take, however, the following passage from *The Creed of Christ* :

“ It may well be that there are mighty spiritual beings in existence, as much in advance of us, *in the present stage of our development*, as we are of the least and lowliest of the ‘ beasts that perish ’; and it may well be that these august personalities play a vital part undreamed of and unimaginable by us, in the direction of the affairs of the universe. But they do so (we may rest assured) as children of Nature; and the laws that they administer and obey are to the full as natural as those under which we live.”¹

Wallace, again, supposed the universe to have been created by subordinate spirits under the guidance of a supreme Deity.²

Quite apart from authority, however, the inherent probabilities of such a theory are amply sufficient to commend it; and in this case we may hope that the human soul will ultimately become worthy to be entrusted with some higher cosmic duty. We need not imagine that its energies will be confined to the control of Nature’s lower forces. To ride in the whirlwind and direct the storm, to rouse the slumbering earthquake from its pillow of fire, to bid “ the thunder when the bull-mouthed breakers flee,” more aptly belong to ministers whose glory is chiefly in their strength. The soul of man will be fit for something higher than the expression of ruthless power. Rich in the experience of all its innumerable selves, it might well be entrusted with the care and control of some rising race of intelligent beings. Human enough to sympathise with their struggles and their failures, yet sufficiently divine to be untouched by their frailties, no worthier guardian of their destinies need be looked for than the age-taught soul of the just man made perfect.

Moreover, though every soul will in due course attain these sublime heights, equality of achievement does not necessarily imply a rigid similarity of nature. We need not, in fact, conclude that at this point all souls will become exactly alike. The same level may be reached by different paths, and it is therefore more reasonable to suppose that

¹ Page 215.

² *The World of Life*, 393.

each soul will develop along its own lines. Consequently, though we should expect to find a general resemblance between these majestic spirits, we should expect also to find that each retained a distinctive character of its own. M. Bergson in a suggestive passage remarks that individuality is never perfect, but "life nevertheless manifests a search for individuality, as if it strove to constitute systems naturally isolated, naturally closed."¹ If for "life" we substitute "divine energy," the passage will aptly accord with that principle of self-realisation upon which we have maintained that this energy proceeds. In such spirits as these, not perfect in the sense of comprehending all perfection, but comparatively perfect expressions of some divine possibility, we may indeed discern an unfolding of Deity which can in all reverence be described as the evolution of God.

What the needs of the universe may be we cannot tell; we can only feel certain that they must be manifold. And it is at least permissible to conjecture that, in order to meet these manifold needs, there may be duly ordained administrators, who are diverse in proclivity, in aptitude, and in character. Perhaps we may venture just one step farther. A spirit which has reached this exalted stage may possibly become itself a centre of creative power, privileged not only to administer, but even to call into existence the system which its special faculties peculiarly qualify it to control.

And at this point the boldest speculation must pause, for the problem of the universe, as it here confronts us, has become too vast for our human thought to contemplate.

And, indeed, our chief concern at present is with a hereafter less remote. Our hopes, our doubts, our longings, converge on the future which is to follow immediately on our earthly life. To those who can see a purpose working to fulfilment in nature this future may be shrouded in mystery, but it will not be darkened by terror. Like the present, it will have its trials and troubles for us. There will be struggles to face and repulses to endure, as well as

¹ *Creative Evolution*, 15.

aims to achieve and victories to win. But on the whole it will be an "ampler day divinelier lit," rather than a "homeless night without." It could hardly be otherwise under any system of evolution. For truly our future will be largely what we ourselves make it. There is nothing vindictive in the divine scheme, but it preserves an inviolate order, wherein cause cannot fail of its effect, or effect arise uncaused. "Consequences," says Mr. Illingworth, "are God's commentaries."¹ What conduct may build into character here will survive into the immediate hereafter, to help our struggle upwards or to retard it. There can be no place in Nature for the forgiveness of sins. For, as sins are part of conduct, and conduct is the outcome of character, wrong conduct can only be exterminated by a reform of the character from which it springs. But wrong conduct is conduct which conflicts with the purpose of the divine scheme, and is therefore appropriately checked and eradicated by the penalties which this conflict naturally entails on the offender. These natural requitals are, indeed, the mills of God, and under their merciful attrition injurious habits are slowly but surely worn away. God is ever calling us to Himself, but until man's character is duly trained, man's heart cannot respond to the call. Sooner or later, conduct which runs counter to the great order of things inevitably brings trouble in its train. If the offender escape it in one stage it will surely find him in another, till at last, as he lies smarting under the stripes of the rod which he has fashioned for himself, baffled in his efforts, weary and bewildered, a healing vision dawns upon him. He sees, if only dimly, the purpose of the scheme, and, with opened eyes, he turns upwards to its Creator. From this point his onward course is sure. For him religion and morality henceforth become one, and the law of duty is blended with the law of love. His way may still be long and difficult, but his face is set towards the stars, and he cannot fail of the goal.

To this, the great hope of religious universalism, there may possibly occur some rare exceptions. Immortality can

¹ *Lux Mundi*, 117.

only be attained by those who deserve it, and though this destiny should be within the reach of all mankind, it may be that, here and there, a soul will fail to achieve it. To me this seems improbable in the highest degree, but it cannot be declared impossible. It is conceivable that a soul whose every self has been a minister of rebellion against the scheme may be so shattered in the struggle that it will at last be unable to ascend. The corrective influences, which should purge, mould, and strengthen it, would in such a case possibly make for its disintegration. The upward course being barred, it could only sink lower, until, perchance, it finally became resolved once more into the mind-stuff out of which it was wrought. *As a mind-structure* it would then perish, and all its identity would disappear. Thus, while immortality is in store for the vast majority of the human race, extinction may be the fate of an unfortunate few.

For most of us, however, the future should be bright with hope. It will bring its requitals, but as we rise higher they will gradually disappear, their beneficent purpose being accomplished. They serve to turn man's steps into the true path, and are ready to curb his wanderings if he should chance to stray from it. But when he is fairly launched on his upward course, loftier motives come in to guide him aright.

"To view even the selfhood that passes away, even the deeds of the hour, as a service of God, and to regard the life of our most fragmentary selfhood as the divine life taking on human form—this is of the deepest essence of religion."¹

This fine thought is the principle which will inspire man's conduct with ever-increasing power as he draws nearer and nearer to his God. As the soul begins to realise its own grandeur it rises above the reach of the temptations which now encumber it, for its energies become attuned to a higher end. As one of God's ministers its only aim will be to further God's purpose and make manifest His glory in the wider arena which will then unfold before it. Nothing then can threaten this high intent, or mar its due fulfilment.

¹ Royce, *The World and the Individual*, ii., 429.

Matter may perish or pass into new forms, but the soul will not be touched by the shock. Its career is not to be measured by the process of the suns, or bounded by the confines of the visible universe. Strong in its purity, loyal to its purpose, confident in its high mission, the soul will remain undaunted and serene,

“Yea, though on reeling stars and worlds outworn
God set the seal of everlasting night.”

6



